

JUNIOR REGIONAL GEOGRAPHIES

BOOK III THE REGIONS OF THE WORLD

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By W H BARKER, B Sc., F R G.S

Formerly Reader in Geography, Manchester University,
and Head of the Geography Department of University
College, Southampton, and

LEONARD BROOKS, M.A.

Formerly Second Master and Geography Master at William
Ellis School, Gospel Oak

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BOOK III

THE REGIONS OF THE WORLD

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P R E F A C E

THIS book, the third of the series, provides a course suitable for a junior class or form engaged in a first general regional study of the world as a whole. Experienced teachers find that before the more detailed regional treatment of the continents is attempted, it is necessary that their pupils should understand the world setting in which the continents and regions are placed. This book attempts to supply this need.

The authors are most grateful to those who have given permission to reproduce photographs.

L B
W. H. B.

March 1924

CHAPTER I

THE PLANET, EARTH

It was a great step forward when men realised that the earth was not a surface more or less flat, but a spherical body having definite movements in space. It is impossible for us to see the earth in space, but we are quite sure now that it is a body such as can be represented by a globe. We know, too, that among the heavenly bodies it must appear like one of the bright stars we call planets : Venus, Jupiter, Mars, and others, which move across the sky and change their position with time. The earth is a planet, and, like all the planets, it is closely related to the sun, around which they all revolve. The earth's dimensions are shown in Fig. 1. Jupiter, the largest of the planets, has a diameter of 86,000 miles. Mercury, which is not only the smallest but nearest the sun, has a diameter measuring nearly 3,000 miles. The earth is over 90,000,000 miles from the sun, whilst Neptune, the planet most distant from the sun, is over 2,700,000,000 miles away. If an express train had started from Neptune to the sun in the time of Christ and had travelled night and day ever since at a speed of sixty miles an hour, it would not yet be half-way there. These distances are so great that they are beyond our comprehension.

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We have learned that all the planets revolve round the sun, though the times of their revolution are not alike. The earth takes a year, or approximately 365 days. Some require a longer period to complete their revolution, e.g. Jupiter takes nearly twelve years, and Neptune 165 years, while others,

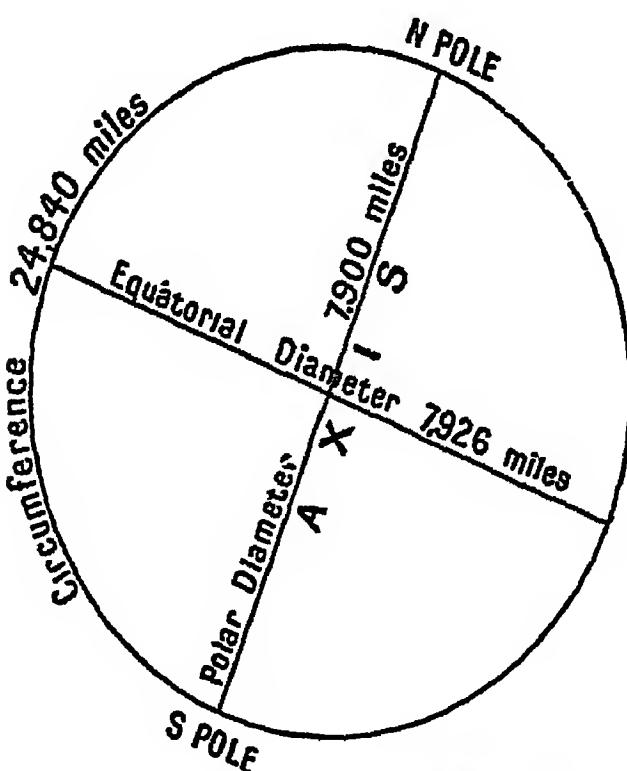


FIG 1.—EARTH MEASUREMENTS.

like Mercury, which takes 88 days, and Venus, which takes 225 days, require a shorter period. This motion round the sun not only gives us the measure of our year, but also gives us the regular change of climate which we call seasons. Thus, in the British Isles and countries in similar latitudes, there is a winter season when fruit and flowers will not grow in the open. With the coming of

spring, the days lengthen, the air is warmer, and Nature and man take advantage of the change. The trees burst into leaf-bud ; the birds think of their nests ; the first flowers appear ; man sows his seed or sets out his plants.

Week after week the sun mounts higher in the heavens ; the days lengthen more and more until the summer has well come in. This is the season of outdoor life, when Nature looks her gayest and man waits hopefully for the fruits of his labour—the harvest of corn and fruit, and the crops of roots and vegetables. With the close of September, the summer garb begins to fade and autumn “ fall ” heralds the approach of winter. Thus, in Britain, does the yearly motion of the earth register itself in a cycle of seasons which fix the periods of seed-time and harvest.

Elsewhere, the seasons are shown in a manner somewhat differently. In many places, as the sun mounts higher in the heavens until it is well nigh overhead, clouds form and rain falls, giving the period for the cultivation of crops. Slowly the rains cease, and then follows a rainless period when plants shrivel up and everything is parched. The seasons here are not marked by alternations of cold and heat, but by rain and drought. Almost everywhere there are changes in the weather conditions with the seasons, and man has had to take account of these changes in order to obtain his food-supplies.

There are places on the surface of the earth where the change of season makes little difference. Thus in the extreme polar regions of both Northern and Southern Hemispheres, it remains so cold except for a few short weeks that little vegeta-

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tion can grow and man would find great difficulty in maintaining life.

Then, too, there are regions where rain but rarely falls at any season. At some periods of the year it is hotter than at others, but perpetual absence of rain prevents the growth of vegetation, except in favoured places, so that seasonal changes are scarcely recorded in the lands where vegetation is sparse and animals are few.

There is one other region where these seasonal changes are but slightly shown, though the cause is in contrast to those mentioned above. In the neighbourhood of the Equator, the heat is always great and it rains almost throughout the year. Consequently there are neither hot and cold, nor wet and dry seasons, nor seed-time and harvest. Week in and week out, new leaves come on the trees and old leaves die off. Man may sow and plant at any time, and after a short period he will gather his food.

We see, then, that seasonal changes play an important part in the life of man, compelling him to work and save if he desires to live comfortably and well. We have seen, too, that some parts of the earth are cold for few or many months, while others have great heat throughout the year. The reason for this is that the heat of the earth, like the light, is derived from the sun. The more vertical are the sun's rays, the more concentrated will be the heat. The heat represented by a beam or " pencil " A would fall on an area *a* at right angles, but on a larger area *b* at 60 degrees, and a still larger area *c* at 30 degrees. Therefore the same heat is distributed over a larger surface

the greater the obliquity, so that for any given area, the amount received must be continuously diminished as the area heated by the same amount of rays from the sun is increased. Thus on the earth's surface, the equatorial regions will be warmer than the temperate regions, and these in turn warmer than those of the poles. Fig. 3 shows this diagrammatically.

It is important that we should know why the noon sun is not always at the same height at the

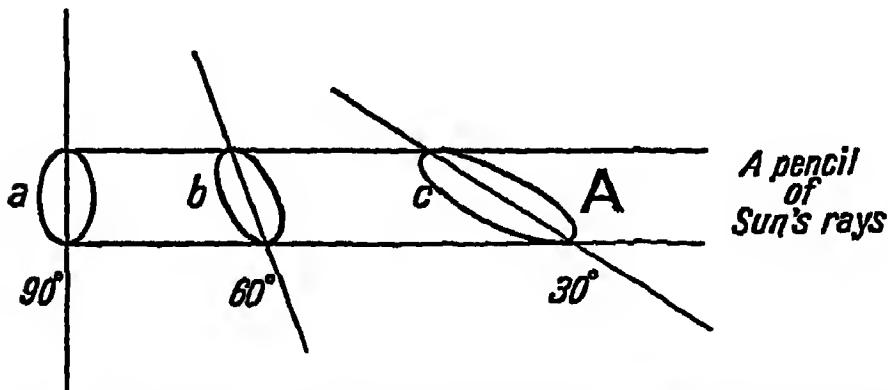


FIG 2—THIS DIAGRAM SHOWS THAT THE MORE SLANTING THE SUN'S RAYS ARE RECEIVED THE GREATER IS THE AREA COVERED.

same place. We have seen that the earth is a great ball. Now this earth ball rotates on an imaginary line which is called its axis. Probably you already know that it takes twenty-four hours, or one day, to make one complete rotation, and that it is this rotation on its axis that gives us day and night. Jupiter rotates on its axis in 9 hours 55 minutes, and the sun in 25·3 days. Besides rotating on its axis, we have seen that the earth revolves round the sun and that one year is occupied in making a complete revolution. During the whole of the time the earth is moving round the

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sun, the axis always points in the same direction, so that on June 21st the North Pole, the northern end of the axis, is tilted towards the sun, which on that day at noon is overhead $23\frac{1}{2}^{\circ}$ north of the Equator. On December 21st the North Pole is

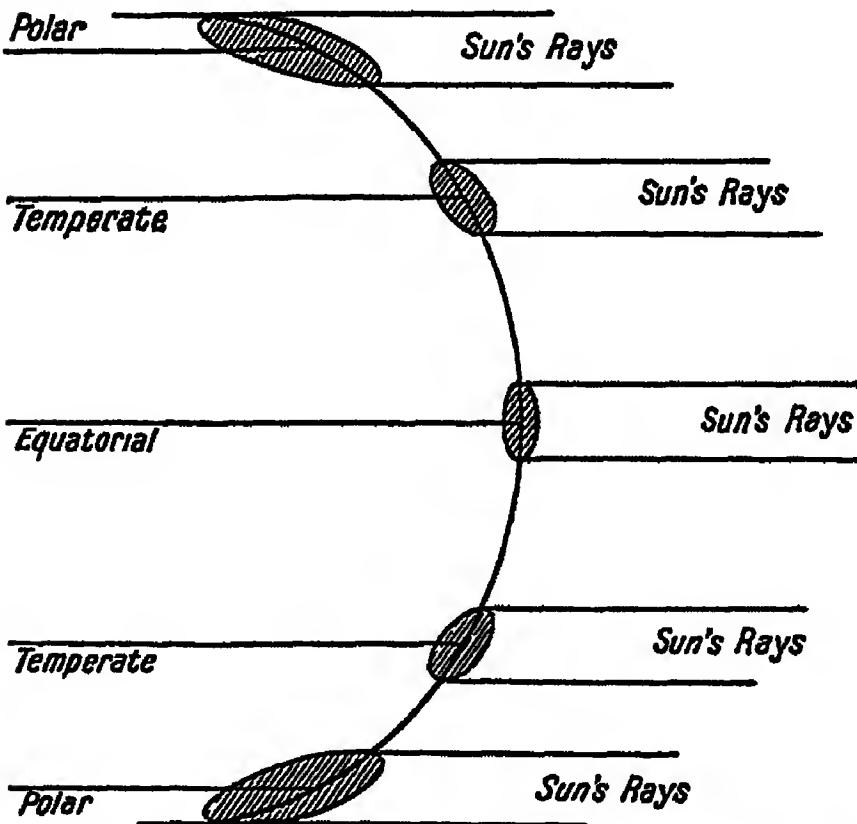


FIG. 3.—This diagram shows that bundles of the sun's rays of the same width cover a smaller area in equatorial regions than in temperate and polar regions

tilted away from the sun, so that on that day the sun is seen overhead at noon $23\frac{1}{2}^{\circ}$ south of the Equator. Thus the tilting of the earth's axis causes the sun to appear to migrate during the course of each year from the Tropic of Cancer (the northern turning-point) to the Tropic of Capricorn (the southern turning-point), whilst on March 21st

and September 23rd the sun is overhead at noon at the Equator.

Thus it is that everywhere in the world the height of the sun changes from day to day, but a greater difference occurs outside the Tropics than within. These changes in the height of the sun cause the amount of heat received from the sun to be greater when the sun is higher than when

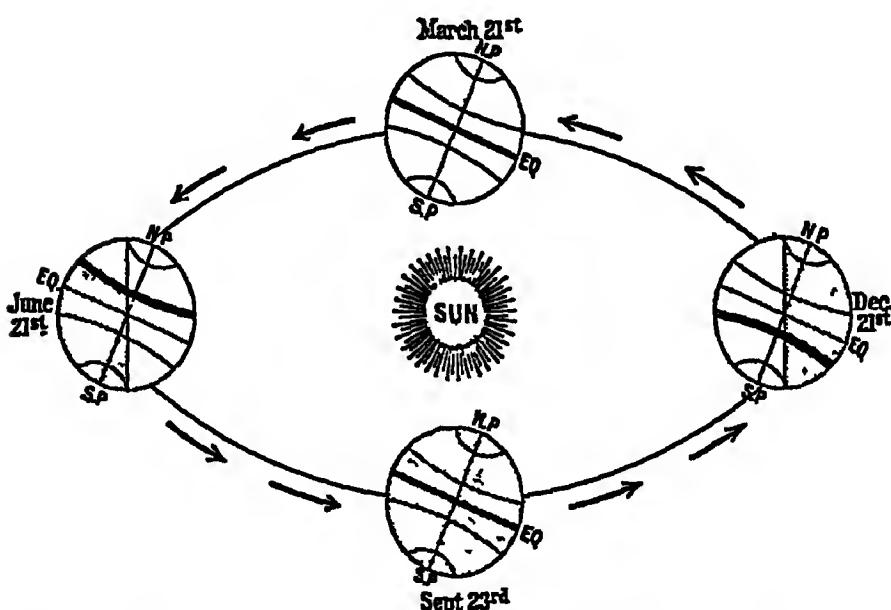


FIG. 4.—THIS DIAGRAM SHOWS THE MOVEMENT OF THE EARTH ROUND THE SUN

it is lower. Summer is the season when the sun is highest ; winter when it is lowest, while spring and autumn come when the sun is midway between its winter and summer positions. This, however, is not the only cause of the seasons. When the noon sun is highest, the days are longest and the nights shortest. Conversely, when the noon sun is lowest in the sky, the days are shortest and the nights longest. It is clear that there will be more heat from the sun when it is shining longest.

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This is perhaps very difficult to master, but a careful study of Figs. 3, 4 and 5 will help, and if the exercises on pages 17, 18 are worked the matter will be still easier to understand.

We are now in a position to see that although the earth is the home of man, all parts of it are not equally suitable either for plants and animals

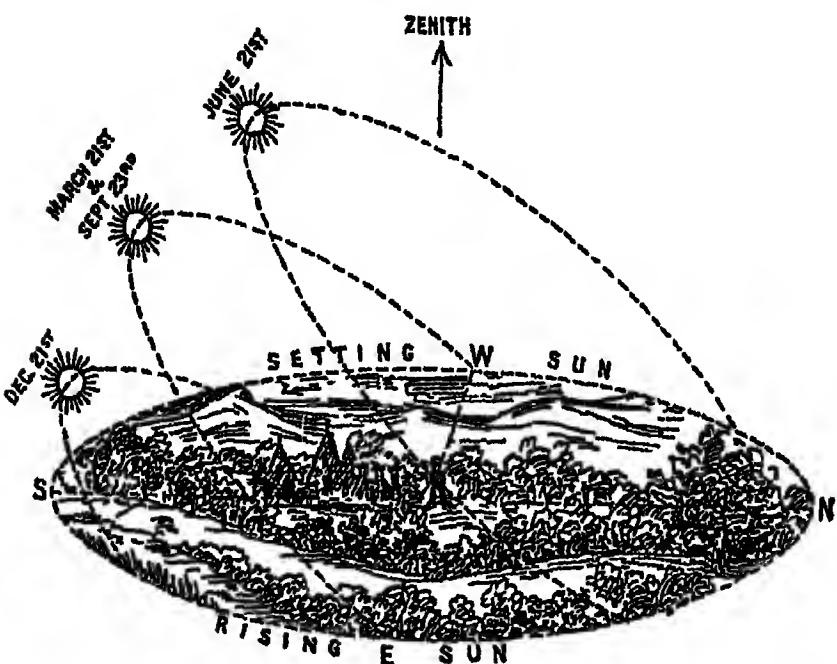


FIG. 5.—This diagram shows the path taken by the sun at the Solstice and the equinox as seen by an observer standing in the position of the boy in the diagram.

or for man. Some parts are too cold and some too hot, some too wet and some too dry, and very few places are in most particulars just what man desires.

Fortunately, by the draining of swamps, by the digging of wells, by the bringing of water from distant mountains to thirsty areas, or by the use of preventive medicines, he can improve some

regions and take precautions against disease in others, whilst there are some he need visit but occasionally, and then only in the best season.

EXERCISES

1. Can you give any reasons why it is believed that the earth is spherical, and not flat, in shape?

2. Study a globe very carefully and find the following: The Equator, the North Pole, the Tropic of Cancer, the meridian of Greenwich. Can you frame a definition for each of these?

3. What name is given to the circles which are drawn on the globe parallel to the Equator? What are those circles called which in passing right round the globe go through both Poles? Where is Latitude 90° N.? Where is the line of Longitude numbered 180° ? What large town is at Latitude 30° N. and Longitude 90° E.? What city's position is Latitude 34° S., Longitude 151° E.? Find the Latitude and Longitude of Cairo, New York, Calcutta, Buenos Aires

4. Compare the noon lengths of shadows cast by the same stick on March 21st, June 21st, September 23rd, and December 21st. Account for the changes

5. By means of a simple instrument for measuring the altitude of the sun, find out the height of the sun at intervals throughout the days mentioned in Exercise 4. Plot these on squared paper and compare the results.

6. Measure the noon height of the sun throughout the year. Plot your results and compare them with daily noon temperature records

7. Make a table of five columns with the following headings Date; Length, in inches, of midday shadow of 6-ft pole, Time of sunrise, Time of sunset, Length of day. In the first column write January 1st, February 1st, . . . December 1st. Find the figures for the second column by actual measurement. Obtain the figures for

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columns 3 and 4 from a local gazetteer or newspaper. Represent the variation in the length of the shadows by diagram and by a curve plotted on squared paper. Also plot a graph on squared paper to show the variation in the number of hours of sunlight.

- 8. What causes the seasons? Why do not all parts of the world experience the same kind of seasonal changes? In which parts of the world are the seasons as we know them in Britain not experienced at all?

CHAPTER II

LAND AND WATER

THE earth is the home of man, but if you look at a globe, you will see that the greater part of the earth's surface is covered with water, and upon this man cannot make his permanent home. Of course it is true that he can make boats propelled by oars, or driven by wind, steam, or oil, in which he can make journeys both short and long, but the ocean is a highway rather than a home. Now turn to a globe. Whenever you wish to know the true shapes and to compare the sizes of big land or water masses you should study the globe, for being a ball like the earth itself, it is the only true map. All flat maps must be wrong in some respect, for they show on a flat surface something which is actually on a curved surface. Of course large maps of small areas are more correct than small maps of large areas. The globe will show you that the greater part of the earth's surface, about three-quarters, is covered by the waters of the ocean, leaving about one-quarter for the land. You will also see that there is more land north of the Equator, that is, in the Northern Hemisphere, than there is in the Southern Hemisphere. If you tilt the globe so that the British Isles are nearest to you, it will be seen that more land is visible

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than water, whilst if you tilt it so that the South Pacific faces you, very little land at all is to be seen. Of course, the land surface, or the surface of the lithosphere, is continuous and forms the beds of the oceans. The water surfaces, or the surfaces of the principal portions of the hydrosphere,

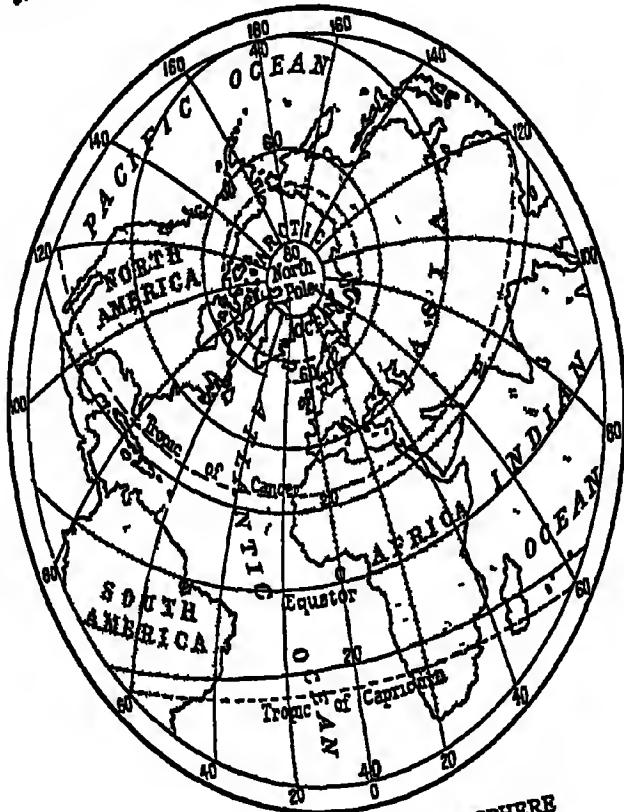


FIG. 6.—THE LAND HEMISPHERE

occupy the depressions in the lithosphere, while the air, or the atmosphere, forms an unbroken covering to both land and water.

The land surface is not in one big mass, but is broken up into islands round which the waters of the great world ocean flow. These islands vary in size, some being of enormous size, and some

bare rocks upon which nothing can live. The vast Old World Island contains the three continents of Europe, Asia, and Africa, the last-named being joined to Asia by the narrow Isthmus of Suez, through which the very important Suez Canal has been cut. Asia is the largest of all the con-

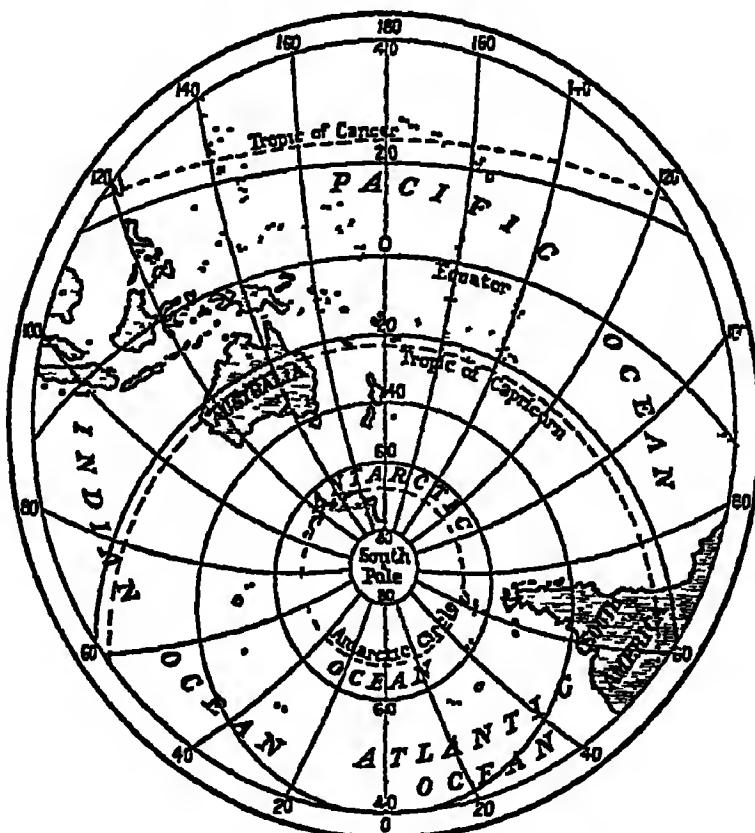


FIG. 7.—THE WATER HEMISPHERE

tinents, and it stretches from within the Arctic Circle to within a few degrees of the Equator. Europe is really a large peninsula of Asia, and the two continents together are spoken of as Eurasia. Africa is a large compact land mass extending almost equally on both sides of the Equator. Next in size to the Old World Island is the New

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World Island, known as the Americas and containing two continents, North America and South America, the former lying entirely north, the latter mostly south, of the Equator. They are separated from each other by the large isthmus of Central America, across which, in the narrowest part, the Panama Canal has been cut. It is easy to see from the globe that the Panama and Suez Canals are the most important canals in the world. South-east of Asia, and lying entirely in the Southern Hemisphere, is the continent of Australia, the third largest island in the world, whilst around the South Pole there is the bleak, uninviting Antarctic Continent.

Now turn to the great world ocean which washes the shores of the continents. Between the Americas on the west and Europe and Africa on the east there is the Atlantic Ocean, the most important of all. Notice that it has a number of branches almost land-locked and cut off from the main body, e.g. the Mediterranean, Baltic, and Caribbean Seas. West of the Americas and east of Asia and Australia is the vast Pacific, which stretches half-way round the earth and covers over one-third of its entire surface. The Pacific contains innumerable small islands, chiefly found in groups, in lines and festoons or singly, in a great belt on each side of the Equator. They stretch eastwards, like stepping-stones from the south-east Asiatic and east Australian coasts two-thirds of the way to America. South of Asia, east of Africa, and west of Australia is the Indian Ocean, enclosed by land on three sides, whilst the Southern Ocean surrounds the south polar Antarctic Continent.

The Arctic Ocean is the north polar counterpart of that continent.

In this brief survey of the land and water masses you may have noticed two striking features whilst examining the representations of the continents and oceans on the globe. You have perhaps noticed that on the other side of the world, directly opposite to each large land mass there is a water mass, and vice versa. That is, land and water masses are antipodal to each other. You may also have noticed the triangular shape of most of the continental masses, and that they are broad in the north and taper towards the south. These matters are related to each other and have led some scientists to form certain theories concerning the shape of the earth, but the statement and explanation of these are too difficult to go into here.

We must now learn something of the surface features of the continents, so that before commencing our real study in the next chapter, we may be familiar with the position and names of the earth's principal physical features. If your globe is not coloured to show the height of the land, you must consult the maps in your atlas. Such maps are known as orographical, relief, or physical maps. Before the maps can be coloured, lines must have been drawn on the maps to separate one colour from another. Thus before a globe or map can be coloured to show (i) land under 600 ft. above sea-level, (ii) land from 600 ft. to 1,200 ft. above sea-level, (iii) land from 1,200 ft. to 3,000 ft. above sea-level, and (iv) land over 3,000 ft. above sea-level, lines passing through all points 600 ft., 1,200 ft., and 3,000 ft. above sea-level respectively

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must be drawn on the map. Such lines are known as contour lines, and they are the principal means of representing the relief of the land on maps.¹ In most of the more advanced countries of the world, as well as in their foreign possessions, the work of contouring has been done carefully by surveyors and map-makers, but many parts of South America, Africa, and Asia have never been accurately surveyed, so that the contours appearing in some maps cannot be relied upon with much confidence.

In using a map, it is important not only to study the methods by which the relief of the land is represented, but also to know the scale to which the map is drawn. This may be stated in the form · 1 in. to 1 statute mile ; 100 miles to 1 in., or in the form of a fraction (the R.F., or representative fraction) · $\frac{1}{63,360}$ or 1 · 63,360, which is, of course, 1 in. to 1 mile, and indicates that the actual country represented on the map is 63,360 times as big as the map itself. Whenever you use a map, make quite sure that you know : (i) the scale to which it is drawn ; (ii) its mode of representing relief.

Fig. 8 is a map of the world drawn on a projection, or map-network of lines of latitude and longitude, which is so constructed that a square inch in any part of the map covers the same area. You can use this map of the world for comparing areas, but you will notice that true shapes are not preserved, especially towards the edges of the map. You must refer to the globe in order to learn correct shapes. On Fig. 8 the contours for 600

¹ The use of *Elementary Exercises in Map Work*, by V C Spary (University of London Press, Ltd), is recommended at this stage.

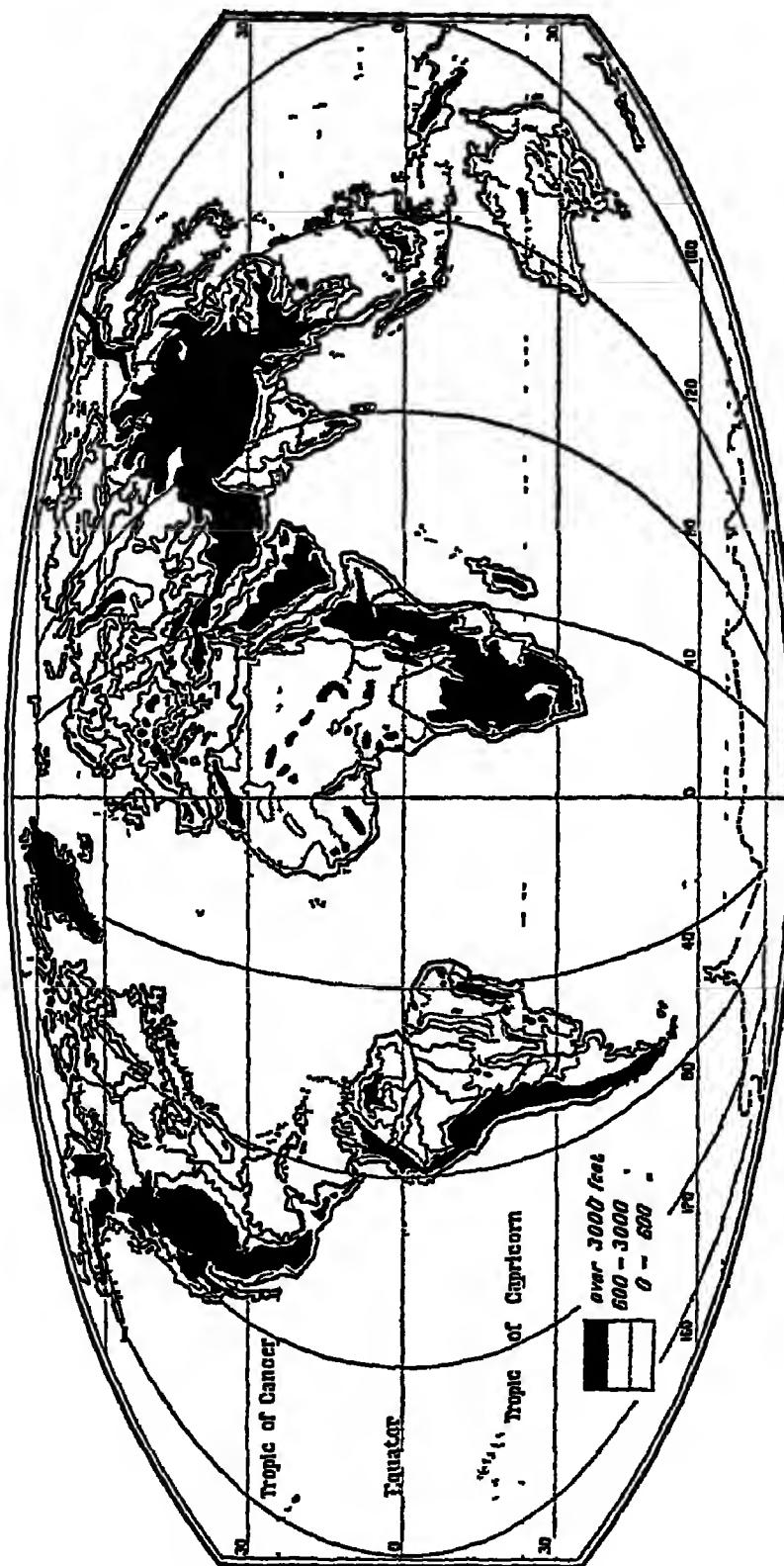


FIG. 8—PHYSICAL MAP OF THE WORLD.

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and 3,000 ft. respectively have been drawn, for these will enable us to study the distribution of highlands and lowlands. You should also refer to your atlas and, if possible, have a globe before you when you read the remainder of this chapter.

Look at North America. The most prominent feature of this great triangular land-mass is the mountain system which stretches from north to south along the whole of the western side of the continent. This system consists of high plateaus or tablelands flanked and crossed by long and high ranges of mountains running from north to south. Such a physical feature is known as a *cordillera*. The best-known ranges in the North American cordillera are the Rocky Mountains, which form the eastern margin of the system, and the Sierra Nevada and Cascade Mountains, which form its western margins in the United States and Canada respectively. On the eastern side of the continent the Appalachian mountain system stretches from Labrador almost to Florida, but is most prominent in the south, where the parallel mountain ridges are very well marked. Around Hudson Bay there is a low plateau system, all that remains of a very ancient highland region. This area is the oldest part of the continent.

The vast plains which connect these three mountain systems are largely made of rock fragments and silt carried from the mountains by rivers and spread out on the floors of shallow seas which after long ages became dry land. Notice the principal irregularities in the outline of the continent. Some of these have been caused by the mountains. For example, the Labrador and Alaskan peninsulas are

northern extensions of the Eastern and Western Highlands. Lower California is a southern extension of the Coast Ranges of the United States, and the Gulf of California is a depression in the process of being filled up by rock waste brought down by rivers. The peninsulas and islands which almost enclose the Caribbean Sea and the Gulf of Mexico are also portions of foundered mountain systems.

In other places the sinking of the land has allowed the sea to cover places which were once dry land, and Hudson Bay, the Gulf of St. Lawrence, the Bay of Fundy, and many others were produced in this way, whilst such islands as Vancouver and Newfoundland, as well as the large islands to the north of Canada, were made where the sea completely surrounded higher areas of land.

Now notice the great rivers of North America. The south-flowing Mississippi and its tributaries, the chief of which is the Missouri, drain practically the whole of the southern part of the Central Lowlands. At its mouth there is a very large and rapidly extending delta. The River St. Lawrence drains five great lakes, of which Superior is the largest sheet of fresh water in the world, and flows eastwards to the Atlantic Ocean. Between Lakes Erie and Ontario are the world-famed Niagara Falls. The Mackenzie flows northwards to an ocean which is frozen for the greater part of the year, while the Frazer and the Columbia, noted for their salmon, and the Colorado, noted for its wonderful canyons, are the principal rivers flowing westwards.

If you turn to the map of South America, its physical resemblances to North America are very

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striking Like North America it is triangular in shape, and for the same reason. To the west lies the great cordilleran system of the Andes, and to the east the plateaus of the Guiana and Brazilian Highlands. Between these mountain systems, and stretching from north to south of the continent, are the central lowlands drained by the three great rivers of the continent, the Orinoco, the Amazon, whose basin is the largest in the world, and the Parana-Paraguay, whose great estuary is known as the Plate River. In outline South America is far more regular than North America.

Africa, like South America, has a triangular form and regular outline, but it is very different from the two Americas in its build. It is a vast plateau, of which Madagascar is an isolated portion. The plateau is lowest in the north, where it is also broadest, and highest in a belt stretching from Abyssinia south-eastwards. It has several great rivers, although, owing to the plateau character of the continent, their importance is diminished, for waterfalls occur where the rivers either descend from one plateau level to another or from the plateau to the coastal plains. This drawback was one of the reasons which hampered the exploration of the continent and caused the interior to remain the "Dark Continent" until recent times. The chief river, the Nile, rises in great lakes in Central Africa, and flows northwards to a great delta in the eastern Mediterranean. The Niger and the Congo reach the west coast and the Zambezi the east coast.

Australia has not the typical triangular form. The western part is a plateau resembling Africa, whilst along the whole length of the east coast, and

extending into Tasmania in the south, there is a mountain system known in different parts by different names, but, in its entirety, as the Great Dividing Range, although it divides the continent into two very unequal parts. Between these eastern highlands and the western plateau lies a lowland extending from the Gulf of Carpentaria in the north to Spencer Gulf in the south. The southern part of this lowland, which was made in the same way as the central lowlands of the Americas, is drained by the Murray-Darling, the largest, and by far the most important, river system in Australia.

The land mass of Eurasia remains. This vast land mass has an irregular triangular form, the three angles being at Spain, Indo-China, and Bering Strait. It is so mountainous a land, and its mountains extend in so many directions, that its coastline is most irregular. Its numerous peninsulas—Scandinavia, Iberia, Italy, the Balkans, Indo-China, India, Korea, etc.—are all caused by the existence of mountains or plateaus. Japan, the Philippines, the East Indies, Ceylon, Corsica, Sicily, the British Isles, and many other islands are all parts of mountains, whilst such enclosed arms of the ocean as the Mediterranean, Red, Black, China, and Japan Seas occupy depressions between mountain uplifts. Parts of Eurasia have sunk below sea-level, so that shallow seas have been formed and islands created. This is particularly prominent in north-west Europe, where sinking has produced the North, Irish, and Baltic Seas and has separated the British Isles from the mainland.

In Europe the principal mountain systems are

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in the north-west, which include the British and Scandinavian Highlands, and in the south, where the Pyrenees, the Alps, the Carpathians, the Apennines, and the Balkan mountains form part of a great system of mountain ranges extending eastwards through Asia Minor and Persia to northern India and the Malay Peninsula. Associated with these mountain ridges are plateaus such as those of Spain, central France, southern Germany, Asia Minor, Persia, Pamir, and Tibet. The Pamir Plateau, the highest in the world, is known as the "Roof of the World," whilst the Himalayas contain the world's highest mountain, Mount Everest, which reaches 29,000 ft. above sea-level.

North of this southern east-west mountain belt is the vast plain of Europe and north-west Asia, which stretches from the Atlantic to the heart of Asia and is only broken by the Ural Mountains. The Eurasian rivers are of great importance, and only the most important can be mentioned at present. Large rivers like the Ob and the Yenesei flow northwards to the Arctic Ocean ; the three great rivers of China, Hwang-ho, Yangtse-kiang, and Si-Kiang, are the principal rivers flowing into the Pacific ; the Indian Indus and Ganges and the Mesopotamian Tigris and Euphrates are the chief rivers entering the Indian Ocean, whilst the three largest European rivers, the Volga, Danube, and Rhine, flow respectively into the completely enclosed Caspian Sea, the almost-enclosed Black Sea, and the open North Sea.

Thus we see that the continents contain vast cordilleran systems, extensive plateaus, and towering mountain chains. In most of these it is difficult

for man to make a home. On the other hand, there are broad plains where transport is easy and human settlement is facilitated. Of course, this is not true of all plains, for some are found in areas where equatorial rain and heat predominate, while others endure polar cold. It is in the lowlands of the temperate zone that man reaches his highest development.

EXERCISES

1. Find in your atlas a Mercator map of the world and compare the shapes of the large continents with their shapes on the globe. Compare, on the globe, the size of Greenland with that of South America, and then notice the relative sizes of these places on the map. Where is the North Pole on the globe? Where is it on the map?
2. Find the parallel of latitude along which there is greatest percentage of land.
3. Write down the names of all the continents and oceans. Find out, in as many cases as you can, how they received their names.
4. What are antipodal points? Find from the globe whether it is true to say that the antipodes of each great land mass is an ocean. Where is the antipodes of Britain?
5. Find points of resemblance in the shapes of the continents. If you are interested in accounting for the reason for the common triangular shape of the continents, you can find out, either from your teacher or from a modern physical geography book, something about the tetrahedral theory of Lothian Green.
6. What are contour lines? Draw contour lines to show (a) a hill, 600 ft high, whose slopes from 100 ft. above sea-level are very uniform; (b) a hill having a long gradual slope to the south and a very steep descent to the north; (c) a river and its tributaries; (d) a ridge of hills. Make a section across each of these features.

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7. What is meant by saying that a map is on the scale of (a) half an inch to the mile, (b) one in a million? Are there any maps in your atlas with which it is impossible to use a scale?

8. Draw east and west "sketch" sections across North America (Latitude 40° N), South America (Latitude 20° S), and Africa (Latitude 10° S), and in writing compare the leading features of the relief of those continents.

CHAPTER III

LANDS OF SNOW AND ICE

WE shall now turn our attention to a survey of the natural regions of the world. The areas that we shall study in this and succeeding chapters are regions having definite characteristics of their own, which mark them off from neighbouring lands. These characteristics are not always found in every part of the region, but we shall usually find that one type of relief, or climate, or natural vegetation, or human activity predominates in each of the regions. Generally, we shall find that all these features go together and are closely related to each other. So marked is this relationship that it is easy for us to think of the whole region as a single unit or natural region. It is clear that when we speak of natural vegetation we mean the vegetation covering which grows without the help or interference of man. It is not artificial or cultivated vegetation. Similarly, a "natural region" should be thought of as the opposite of an "artificial region" whose boundaries have been determined by man. Most political units have artificial boundaries and are "artificial," not "natural" units.

In this chapter we shall study those regions which may be called "Lands of Snow and Ice." These

are either lands buried beneath thick caps of ice, like Greenland and the Antarctic Continent, or undulating lowlands, called "tundra" and "barren lands," occupying the cold northern shores of the

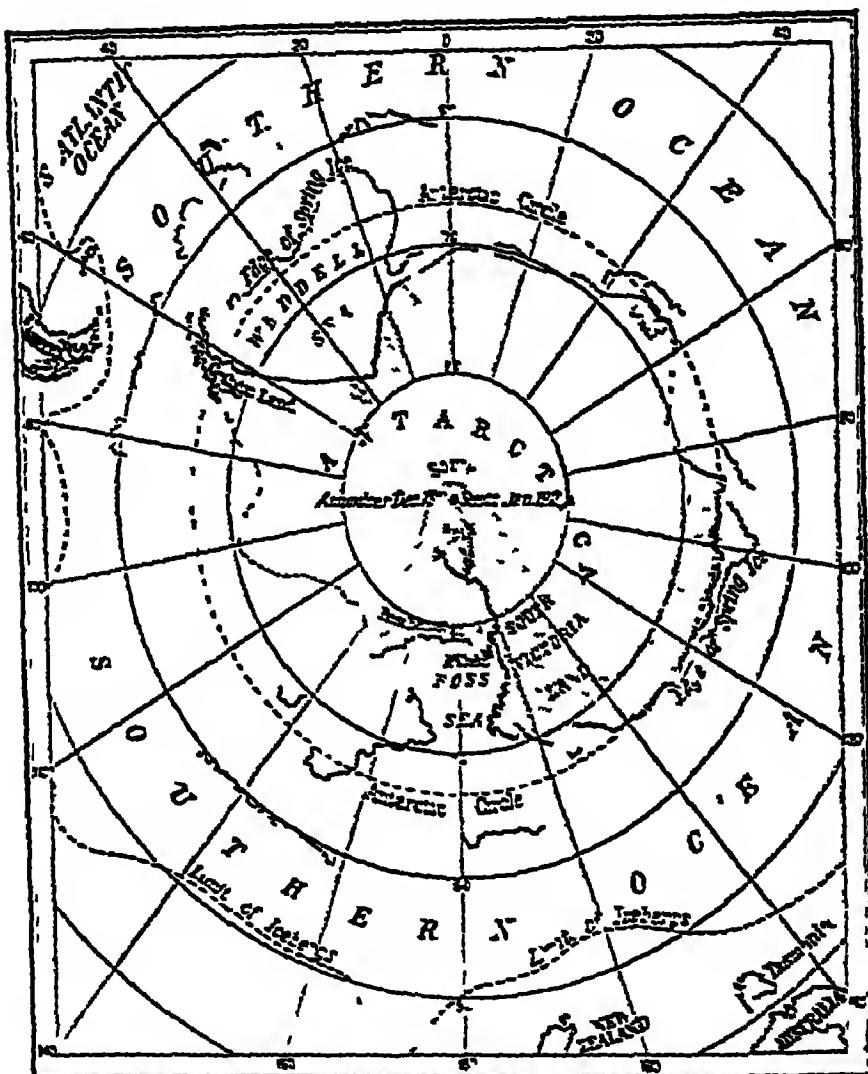


FIG. 9.—MAP OF THE ANTARCTIC CONTINENT AND ITS OCEAN MARGINS.

continents ringed around the Arctic Ocean (see Figs. 9 and 13). Such lands should be thought of as cold deserts, for they are dry and support comparatively few types of animals and plants.

The interior of the Antarctic Continent is the world's greatest cold desert. From what we have learned through the explorations of Scott, Shackleton, Amundsen, and other men who have ventured into this bleak and uninviting region, the land itself is a high plateau some 8,000 to 10,000 ft. above sea-level, which in some parts is bordered by high mountains, and in others reaches the sea



FIG. 10.—DIFFICULT TRAVELLING OVER SOFT SNOW.

The party is travelling southwards towards the Pole

in towering cliffs of great height. This plateau is covered by a great sheet of ice of almost uniform thickness, which, as a general rule, does not quite reach the sea. But in one part of South Victoria Land (see Fig. 9) the ice spreads over the coastal plain and even out to sea, ending in a vast, impressive-looking wall of ice, 400 miles wide, and known as Ross Barrier. It has been estimated that the sheet moves seawards at the relatively rapid rate of 500 yards a year. From its front,

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enormous, flat-topped icebergs, frequently many square miles in area, break off to the accompaniment of tremendous noises and float away northwards.

The climatic conditions on the top of the Antarctic ice-sheet are such that it is impossible for human life to be supported. Captain Scott and his companions frequently recorded day temperatures of -30° F. and night temperatures of -40° F., whilst they suffered terribly from gales, blizzards, and surface conditions—"like pulling over deserts, not the least glide in the world." You should all read Scott's last message to the public. Here are one or two extracts : ". . . our wreck is certainly due to this sudden advent of severe weather, which does not seem to have any satisfactory cause. I do not think human beings ever came through such a month as we have come through." "We are weak, writing is difficult, but, for my own sake, I do not regret this journey, which has shown that Englishmen can endure hardships, help one another, and meet death with as great a fortitude as ever in the past" "Had we lived, I should have had a tale to tell of the hardihood, endurance, and courage of my companions, which would have stirred the heart of every Englishmen. These rough notes and our dead bodies must tell the tale . . ." It must be remembered that Scott and other explorers made their journeys in the southern summer, when there is continuous day. What must be the conditions in July, when darkness reigns supreme and the sun is not seen at all! We can write down such an ice-cap region as one of lasting hunger and privation, one unfitted to

be the home of man ; one which demands the lives of gallant men who strive to learn its secrets.

The interior of Greenland resembles the ice-cap of the Antarctic Continent. It, too, is covered by a thick sheet of ice, from which, in summer, icebergs break off and are carried southwards by ocean currents to be a grave source of danger to ships. In both Greenland and Antarctica there are some coastal margins where conditions are more favourable, especially in Greenland, where many small permanent Eskimo settlements are to be found. Peary, who claimed to have reached the North Pole in 1909, was almost startled one day when he descended from the ice-cap into a peaceful valley where flowers were blooming, bees humming, and musk-oxen grazing. The people who inhabit these marginal lands are chiefly employed in fishing and hunting. There are no permanent human settlements in Antarctica, but the corresponding marginal lands are inhabited by penguins and seals, and the seas by whales (see Figs. 11 and 12). It is not improbable that summer whaling and sealing industries will be established there in the future.

The tundras of Eurasia and the corresponding "barren" lands of North America are of greater importance. But even there the summers are short, the winters long and cold, the rainfall is slight, the ground never thaws below a depth of a foot or so, and, as a result of these conditions, the natural vegetation consists chiefly of mosses, numerous small flowering plants, lichens, and berry-bearing and other bushes. The rivers which cross these Arctic lowlands flow from south to north,

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so that in spring, when the thaw comes, their upper courses are supplied with water from the melting of ice and snow, whilst their lower courses are still frozen. This is the cause of large tracts being under water in summer. Millions of mosquitoes make life in these swampy lowlands



Photo by the Underwood Press Service.

FIG. 11.—THOUSANDS OF PENGUINS LOOKING AFTER THEIR NESTS.

quite unbearable, so that at that season the inhabitants have to keep as far as possible to the higher portion of the tundra.

The inhabitants of the tundra of northern Europe and Asia belong to various tribes, and are known by different names. In northern Norway and Russia there are the Lapps and Finns, and in

northern Asia the Ostyaks, Samoyads, Yakuts, and other similar tribes. Mention has just been made of the fact that several tribes are represented. This is very interesting, for we find that men of the same racial family as some of those inhabiting the tundra are much taller in more southerly lands, whilst in these cold, barren wastes all the natives, whatever their origin, are small and undersized. This is undoubtedly an example of the influence of climate upon man. The climatic conditions not only influence stature, but the whole mode of life, for all tundra dwellers appear to have been compelled to adopt similar ways and means of existence.

The Asiatic tundra has very little to offer to its native inhabitants as a reward for their labour, although, as we shall see later, more highly civilised man may be able to increase its pro-



Photo by Underwood Press Service.

FIG. 12.—SEALS ALONG THE WATER'S EDGE.

ductivity in certain directions. The subsoil is permanently frozen, so that, apart from the climatic conditions, agriculture is impossible. The sparse vegetation is, fortunately, able to support herds of reindeer, but provides nothing for the support of

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human life except certain berries. Tundra dwellers are therefore compelled to depend for their food upon the reindeer, the fish which they catch in the

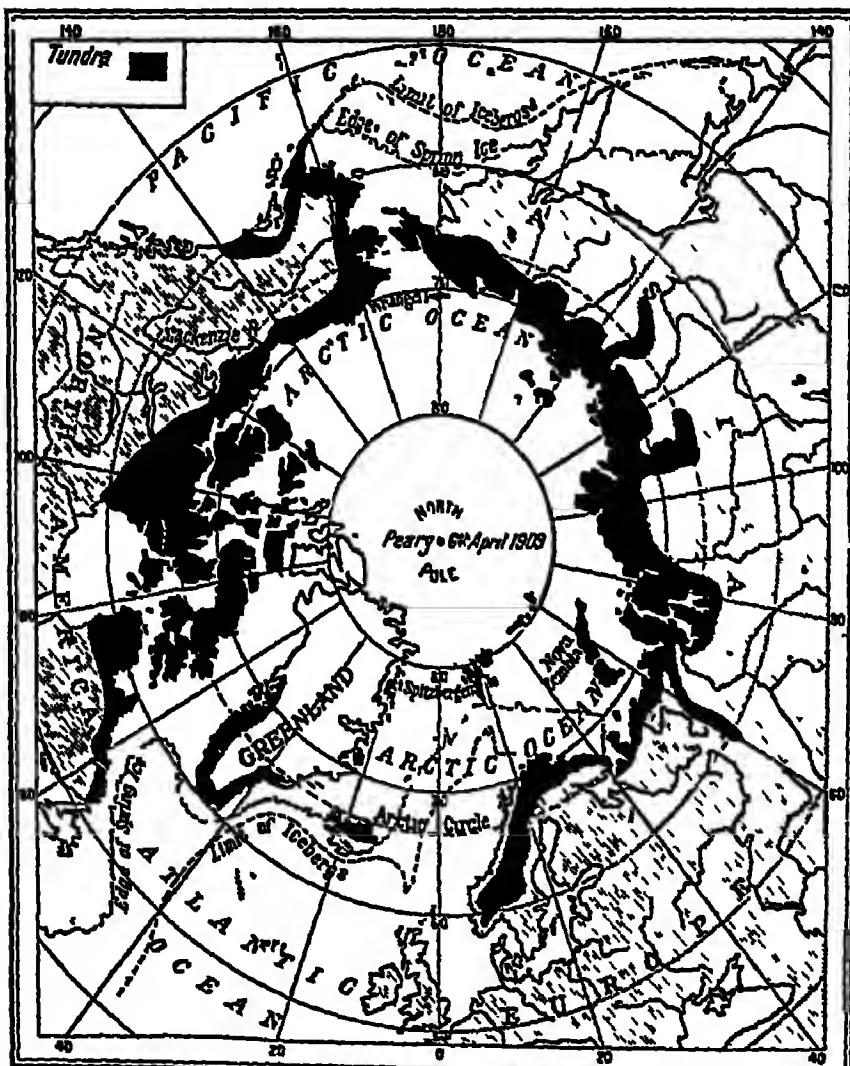


FIG. 13.—THE ARCTIC REGIONS, INCLUDING THE TUNDRA OF NORTH AMERICA AND EURASIA

rivers and sea, the wild animals which they can hunt, and the birds they can kill. Reindeer are indispensable. They roam about in a semi-domesticated condition in search of moss, in discovering which they show extraordinary sagacity, their owners

meanwhile following them from place to place. The possession of a few reindeer means that a man and his family have most of their needs supplied. To own a large number is to be quite a rich man. Alive, the reindeer is used as a beast of burden, and provides milk. When killed, every part of its body supplies something useful—the skin for clothing and tent covers, the flesh for food, the horns and bones for tools and implements, and the sinews for thread, etc. Fishing is carried on chiefly in the late spring and summer, when the rivers thaw and fish are abundant. The men catch the fish, and to the women falls the task of drying enough for use in the long winter when fishing is impossible. The families dependent upon fishing alone have a far more insecure existence than those supported partly by fishing and partly by the reindeer. A certain amount of hunting is possible, especially in winter, when it is the custom to migrate as far southwards as the northern edges of the great forest belt.

From what we have learned it will be evident that tundra dwellers live nomadic or wandering lives, and that the summer will be the season of most changes. For this reason a fixed house is impossible, but the winter dwelling is of a more permanent type; indeed, in many cases, one dwelling is used throughout the whole of that season. The summer houses are tents which are easily carried, erected, or pulled down. They are made of a framework of poles covered with skins or bark. The winter houses are generally made of a framework of wood covered with turf or earth.

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We have seen that for food and clothing tundra dwellers depend very largely upon the reindeer. Some tea and tobacco are obtained from traders, and are greatly prized. Important articles of winter clothing are the hood, the thick skin gloves which are attached to the sleeves, and the warm fur boots. A mother carries her baby in her hood. She covers it with furs, and laces it into a skin cradle which she carries on her back. Travellers tell us that children are generally kindly treated, although tundra boys and girls can never enjoy real home life when the home comforts are so few, and the place of habitation is constantly being changed. The position of the aged, the sick, and those who are not strong enough to take their part in the hard struggle for existence is often very hard indeed. They are sometimes neglected and left to perish.

The Barren Lands of North America somewhat resemble the tundra of Eurasia, but the life of their Eskimo inhabitants is different, because it is only in recent years that the reindeer has been introduced from Asia. Its North American counterpart, the caribou, is a wild animal and has not been domesticated. The lack of domesticated animals has caused the Eskimo to get his living entirely by berry-collecting, fishing, bird-catching, and hunting, and his main source of supply (fish, seal, and walrus) is found in the sea. The tundra dweller lives chiefly away from the coast, the Eskimo lives chiefly near the coast.

In smallness of stature, and in facial appearance, the Eskimo resembles the tundra dweller, for both are of Mongolian descent. He also lives in a tent

in summer, but in winter he usually builds a hive-shaped snow house called an *igloo*, which is entered by crawling along a small ice tunnel built to keep out both cold and polar bears, the Eskimo's chief enemies.

The following extracts from some of the books of Stefansson, the famous Arctic explorer, are interesting and instructive. They describe condi-

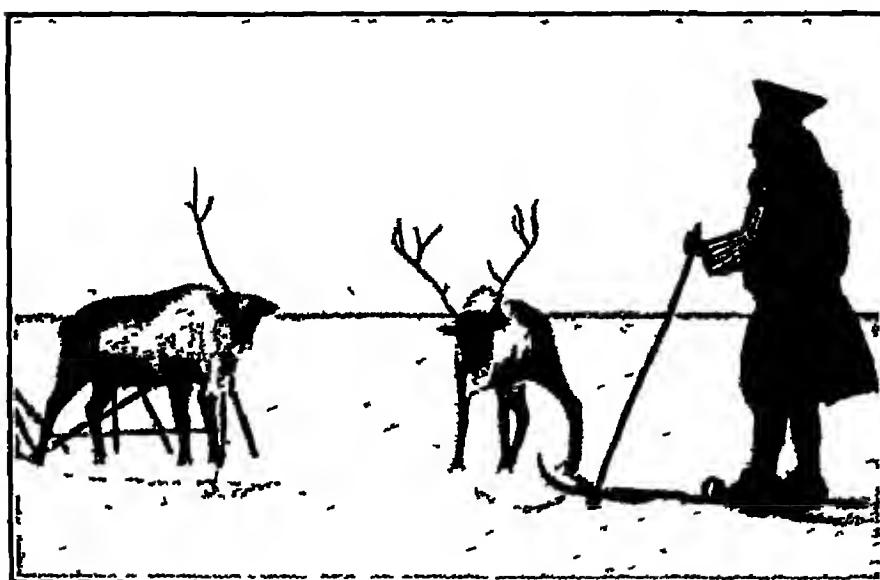


Photo by Moravian Mission

FIG. 14.—A LABRADOR ESKIMO WITH REINDEER.

tions in the "Barrens" of North America. "Writers of Arctic romance have given the period when the sun does not rise at all the name of 'the Great Night,' but that conveys a wrong impression. We were only about a hundred miles north of the Arctic Circle, and at that distance you have something like six or seven hours of daylight clear enough for reading large print out-of-doors. The sun never actually rises, but at noon you can see the glow of it in the south. The Mackenzie

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Eskimos, when travelling at this time of the year (and it is their favourite time for travelling), get up about one or two o'clock in the morning, spend three or four hours in cooking and breakfast. They then hitch up the dogs any time between five and seven o'clock, and are on the road some time before the faintest dawning" "In mid-winter it is almost impossible to hunt caribou or mountain sheep, and less pleasant than usual to fish or to trap. Accordingly they make it the



Photo by Moravian Mission

FIG 15.—A SLEDGE PARTY SETTING OUT FROM WINTER QUARTERS
It was taken in Labrador

holiday season and utilise it for taking long journeys and for dancing, singing, and general rejoicing"

"One of the pleasant things about the North is that the winter snow is perfectly dry. You can travel through six months of winter with feet dry inside deerskin boots that are not waterproof, but you become wet in six hours of May travel, though your boots be watertight."

"Of course, the same summer heat that makes overland travel difficult makes boat travel possible,

and the Eskimos take advantage of that. The spring is, therefore, the time for making boats and putting boats in order." "With the increasing heat come swarms of mosquitoes. Besides mosquitoes, there are many other kinds of flying insects—bumble-bees, butterflies, dragonflies, horse-flies, bluebottles, and the like. There are also many kinds of beetles, worms, and other crawling things. This rich insect life corresponds to the rich vegetation of the prairie. It seems to me that in most places 'prairie' is the best general name for the Arctic grasslands, but in many places you would speak of them rather as meadows. There are also patches here and there where mosses and lichens prevail, so that the name of neither prairie nor meadow fits it exactly." "I think there can be no doubt that for every ton of mosses and lichens on the lands beyond the Arctic Circle there are at least ten tons of flowering plants, and moreover such plants as grasses and sedges grow afresh every year while certain species of lichens cropped by herbivorous animals require many years to replace themselves."

These American and Asiatic arctic lands, even with this comparatively poor vegetation, Stefansson believes could be used for keeping herds of reindeer and caribou for supplying the peoples of America and Europe with meat. "Those who have no personal familiarity with the polar regions find it strange that these animals flourish there. But they are native animals. Each creature flourishes best in a peculiar environment of its own. Cattle and giraffes can fend for themselves in the South, but would die in the North. Reindeer and caribou

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flourish in the North, but would probably not get along very well in the tropics. They are in no more need of shelter from a blizzard than a Texas steer needs shelter from the rain, nor are they more likely to freeze to death than a giraffe is to die of sunstroke. The reindeer is no more likely to starve to death in the North because the ground is lightly covered with snow part of the time than a fish is to die of thirst because the ocean is salty all the time." What, then, asks Stefansson, is the North good for? It is going to become the greatest meat-producing area in the world, and eventually the only area where meat is produced on a large scale.

But these northern lands may become, and indeed are becoming, valuable for other reasons. Already, there is a great possibility of oil being obtained in the lower valley of the Mackenzie River, and who can say whether towns may not spring up here, like those of Dawson City and Sitka, in Alaska, where gold has been found? The island of Spitsbergen was called until quite recently "No Man's Land," but to-day its rich deposits of coal are being worked by British and Norwegian companies and shipped to the Scandinavian and Baltic countries where coal is scarce. Far from being "no man's land," it is now realised that in granting it to Norway after the Great War, the Allies were making to that country a very generous gift. Moreover, these Arctic seas have great value on account of seals, whales, and other forms of life. Good harbours become increasingly important as bases for the sealing and whaling boats, while the suggestion has been made for having airways between Europe, Asia, and America. Some of the

shortest of these routes would cross the polar regions. Wrangel Island has come very much into prominence because of its possible future importance in these connections. Until now, it, too, has been a "no man's land," but Canada, Russia, Japan, and other countries are desirous of its possession.

In years to come, the tundra and the barrens, which at present we regard as cold, bleak, and uninhabited, as lands of hunger and privation, may have an importance which will attract thither many peoples from the lands farther south.

EXERCISES

1. Why is the distribution of tundra confined to the Northern Hemisphere?
2. At what time of the year did Amundsen, Scott, and Shackleton make their attacks on the South Pole? Why is this? Where were the winter quarters located?
3. What differences do you notice between the distribution of land and sea at the two poles?
4. Write an essay on the contrasts between a day in the life of an Eskimo in winter and in summer.
5. Why can you describe the Barren Lands of Northern Canada as a "natural region," and withhold the term from Canada as a whole?
6. Why is it that the length of day throughout the year varies more in the tundra than in England?
7. Give full reasons why the tundra may be called "a region of hunger and privation." Would this description be applicable if Stefansson's prophecy comes true?

CHAPTER IV

LANDS OF COLD FORESTS

IN the tundra and the ice-cap lands the severity of the climate, the strong winds, the frozen soil, and the little rainfall all make it difficult for any but the very hardiest of plants to survive. South of the tundra a belt of forests stretches unbrokenly right across North America from the Pacific to the Atlantic, and across Eurasia from the Atlantic to the Pacific. This belt of northern forests, also called the "taiga," contains the lands of the cold forests which we shall study in this chapter.

In these vast belts of forest land the climate is decidedly cold and moist. One writer says that the yearly average temperature is usually from 38° to 46° F., with possible extremes from -58° to 122° F., so there may be extreme cold in winter and very great heat in summer. The rainfall is generally from 12 to 25 in. per year and falls fairly regularly throughout the year, in mid-winter, of course, in the form of snow. The soil is almost always poor, and largely consists of sand, clay, and gravel spread out by melting glaciers and ice-sheets of past ages. To live in such a severe climate and poor soil it is necessary that the trees should have special equipment. They must be protected

against too severe cold and winds ; they must be very frugal in their requirements from the soil ; they must grow very slowly and must be able to store up food reserves. The pines, firs, spruces, larches, and other trees found in these cold forests are all able to do this. The leaf surface is reduced to a minimum, for the leaves are short and needle-shaped and their thick, leathery skin affords little grip to the wind, whilst in spite of the large number of leaves on each tree, the total leaf surface, the most active and most delicate parts of a tree, is relatively small and thus conifers are protected against drought

"The whole structure of the conifers is interesting as an adjustment to the prevailing conditions. The conical shape of the trunks, with broad bases and tapering tops, makes the trees stable even in strong winds. This stability is increased by the remarkably short development of branches ; only when the top shoot has been destroyed do the side branches approach the size of those of our broad-leaved trees. The great proportion of wood to leaves is striking, and this wood stores an abundance of reserve food in the form of starch in its tissues. Indeed these conifers may be regarded as large stores of food with growing tops which are not very active. They spend little, earn little, and hoard much ; they lead a slow, thrifty kind of life, well adjusted to the circumstances in which they are generally placed : a spell of bad weather in the growing season would mean disaster to a more luxuriant type of vegetation."¹

Now let us turn to the North American forest

¹ From *Plant Geography*, by M. E. Hardy (Oxford Press).

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belt. Before Europeans went to America, its only human inhabitants were scattered Indians engaged in fishing and in trapping fur-bearing animals, for

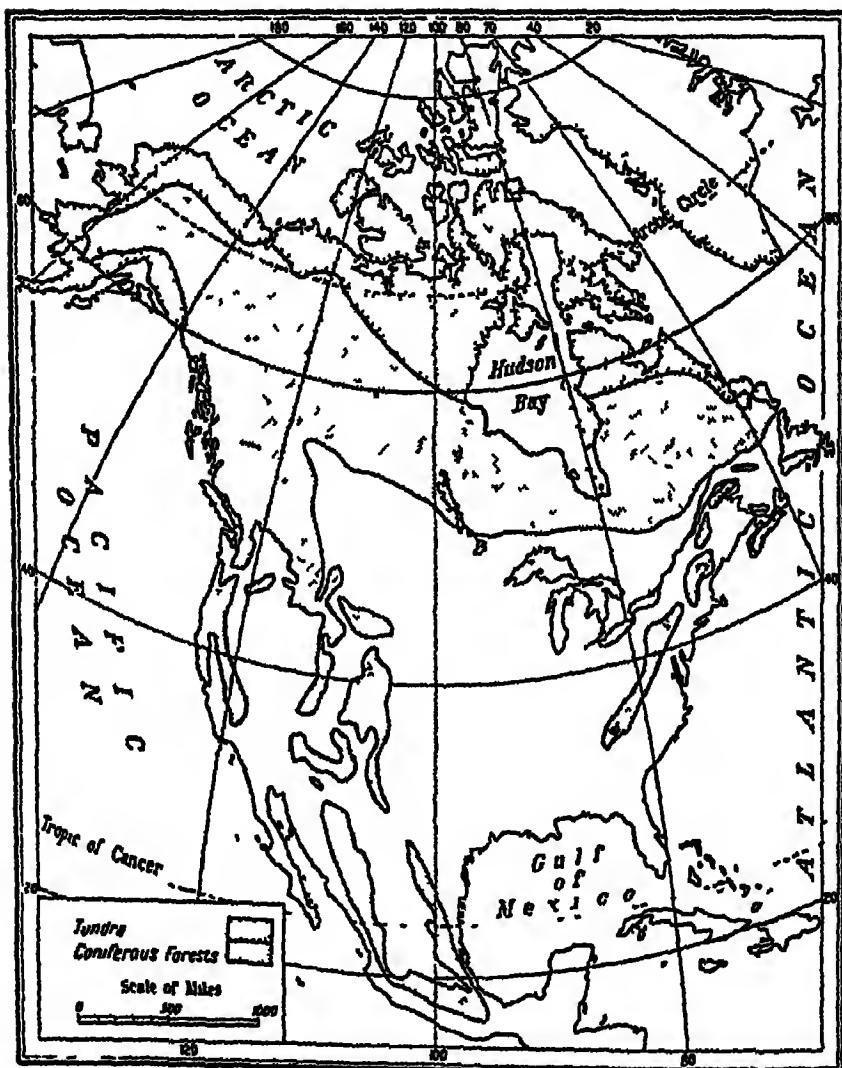


FIG. 16—CONIFEROUS FORESTS OF NORTH AMERICA

the taiga is the home of a large animal population. There are brown, black, and grizzly bears, and ermine, sable, beaver, marten, fox, and minx. Some of these animals have skins which are much prized for warm winter clothing, and the famous

Hudson Bay Company founded stations to carry on trade in skins with the trappers. If you look at a map in your atlas, you will find that some of

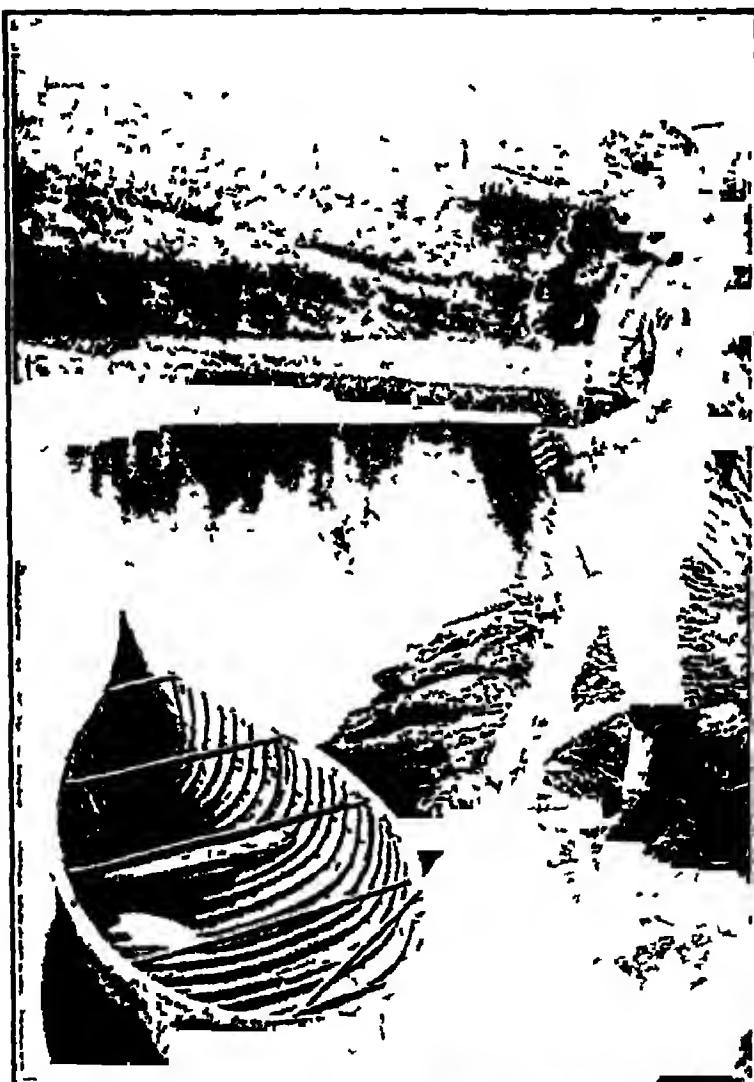


Photo by Underwood Press Service

FIG. 17.—A TRAPPER HUNTING MOOSE

He is making a call in imitation of that of the moose, and by so doing he hopes to bring the animal within range of his gun.

these stations are marked, e.g. Churchill, Port Nelson, York, and Severn. Winnipeg has grown out of another of these stations, Fort Garry. The

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trapper works hardest during winter, when the coats are thickest and at their best, and he stores his furs until the thaw sets in. Often he has very many miles to go to reach the nearest station. Sometimes he will go alone, sometimes he takes his wife and children and the whole of their family belongings, and sometimes several families make the journey together. As one traveller says, " All the household goods have to be carried along. The leather tent, the battered copper kettle, the axe, the papoose strapped in the moss bag, the two puppy-dogs, yet unable to shift for themselves, the snowshoes for hunting, the tattered blanket, the dry meat ; it makes a big load all told ; and the squaw and dog toil along with the difficulty of it. The brave, of course, goes before, deigning only to carry his gun, and not always doing that ; the wife is but a dog to him."

At the station the furs are exchanged by barter for fish-hooks, cartridges, pistols, rifles, gunpowder, blankets, food, and other necessities. The station is quite busy in the summer when the trappers—and nowadays there are whites as well as Indians—come in with their furs, but in winter it is practically deserted. It will readily be imagined that the lot of the Company's officers who work at one of these stations is both lonely and very hard. In passing, it might be noted that many popular ideas of Indian trappers are incorrect. Just as the white cowboy can easily surpass the Indian in horsemanship, so the white trapper can excel him both in trapping and in trail-finding.

The early trappers were followed by the lumbermen, whose life is also one of hardship and

hard work. The forests which were first attacked were near the coast in New England, Newfoundland, Nova Scotia, New Brunswick, and along the banks of the St. Lawrence and its tributaries. It must be noted, however, that in some of these places

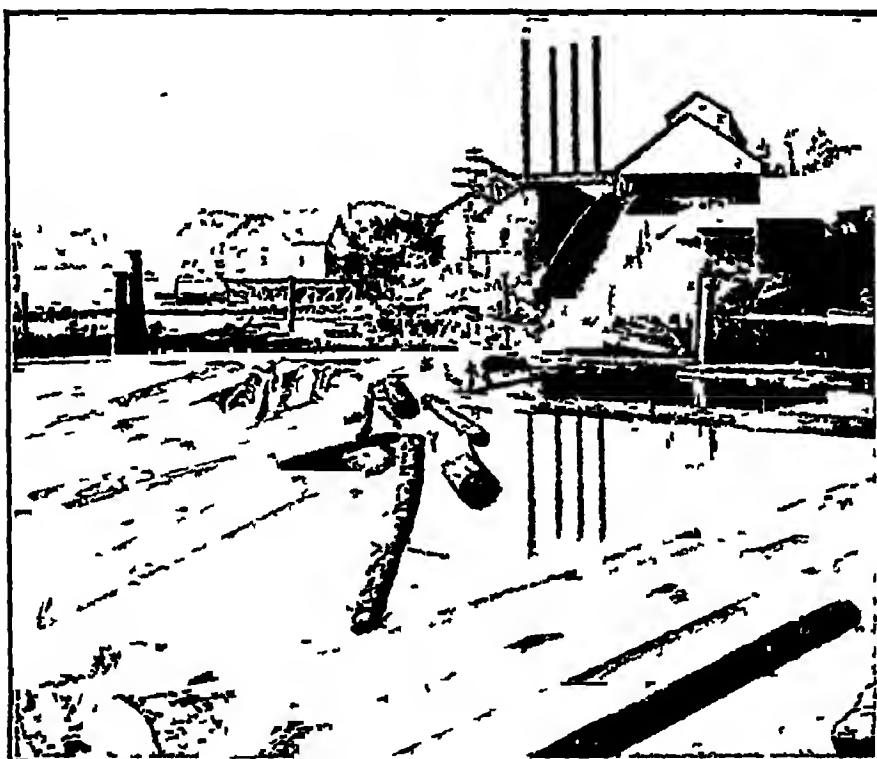


Photo by Canadian National Railways

FIG. 18.—A TYPICAL BACKWOODS LUMBER MILL IN BRITISH COLUMBIA

Note the means of moving the lumber from the lake to the mill

the forests are not entirely coniferous, but are of the mixed conifer and broad-leaved type. Even to-day the lumbering industry is largely confined to the same areas and to British Columbia, noted for its gigantic Douglas firs, for the timber cannot profitably be utilised in places where serious transport difficulties are presented.

The coniferous forests of Canada are ex-

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tremely useful for their soft and easily workable timber, and lumbering is the chief industry there to-day. Bands of workmen go out to forest lumber encampments in the autumn and remain there during the winter, when not only is the timber easier to cut down, but transport to the nearest river is easier over the frozen, snow-covered ground. The trees selected for felling are cut down, the small branches are lopped off, and the trunks are then dragged by horses, or allowed to run down a slide, to the nearest river. The rivers are frozen, and thus it is possible for the logs to be piled up on the ice. When spring comes the lumbering season ends. The rivers, swollen by the melting of snow and ice, carry the logs, which are sometimes fastened together in the form of a huge raft, downstream to the sawmills. These are generally placed near to falls or rapids, for in such places it is often possible to generate hydro-electric power. Ottawa, near falls on the river of the same name, is the capital of Canada, and also its principal lumbering centre.

Not only is the wood used for various forms of joinery, carpentry, matchmaking, etc., but in modern times lumbering has given rise to several most important industries. The timber yields tar, resin, turpentine, wood-alcohol, and other chemical products obtained by distillation. Mills have also been erected in which the softer woods are reduced to pulp and often manufactured into paper on the spot. Several London newspapers have their own lumbering, pulping, and paper-making plant, and their London offices receive great rolls of paper all ready to feed the printing presses.

Following the lumbermen, in those places where the climate and soil are suitable, come the agriculturists, who make permanent settlements—for the trappers and the lumbermen are birds of passage—and either cultivate the land or rear domesticated animals and poultry. Everywhere on the southern margins of the taiga, margins which are steadily retreating northwards, the axe is being more and

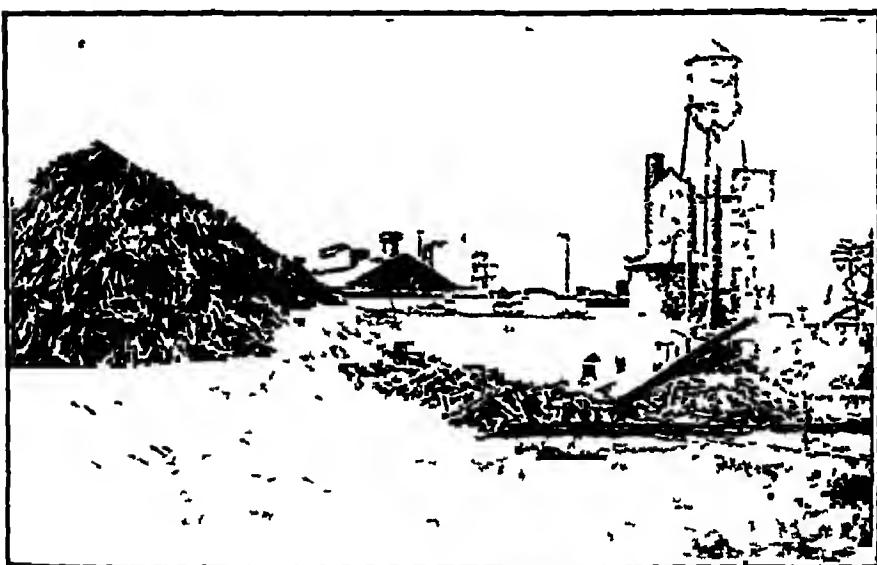


Photo by Canadian National Railway

FIG. 19.—AN ONTARIO WOOD-PULPING PLANT FOR PAPER MANUFACTURE
The paper used in this book contains some wood pulp

more closely followed by the plough. In eastern Canada and in New England barley, oats, and rye; fruit and vegetables; live stock and dairy produce, are the chief products.

The same kind of development has taken place in parts of the great taiga belt stretching across the Old World. Scandinavia and Finland are forested lands where lumbering and mixed farming are important industries. Archangel, on the White

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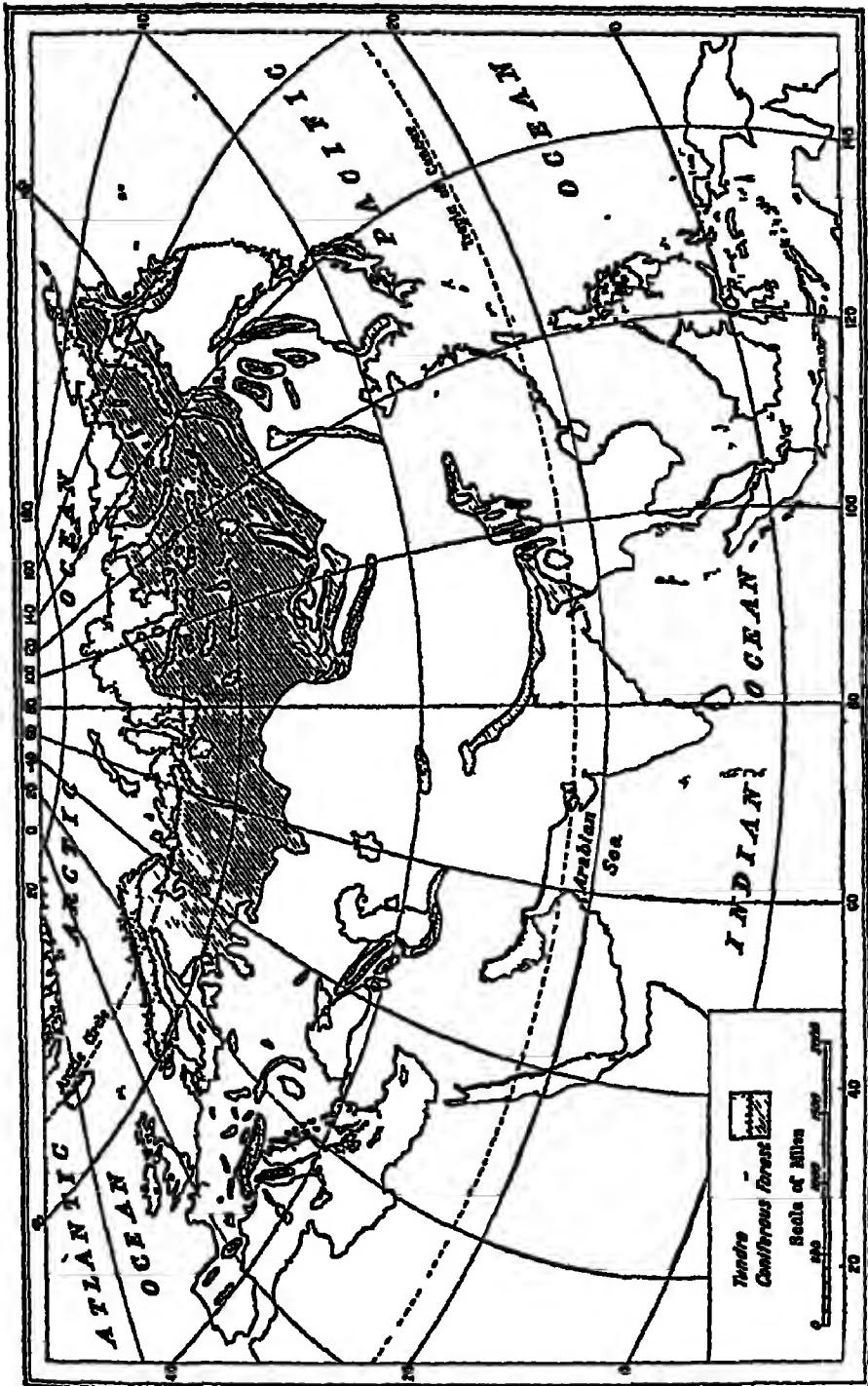
Sea, has an important trade in furs and forest products, whilst along the southern margins, large areas of former forest are now devoted to agriculture. In north-eastern Russia and in Siberia distance from means of communication has retarded development, trapping is still the chief industry, and the backwoodsmen—Samoyads, Yakuts, etc.—are still at a crude and backward stage of civilisation. The region has, however, great possibilities for the future, provided that the means of transport and communication by sea, river, road, and rail are improved.

In both the American and the Eurasian regions there is some mineral wealth, but mining is not very important except near the Great Lakes of America. Here iron ore is very important, especially on the shores of Lake Superior. At Sudbury, north of Lake Huron, nickel and copper are found.

We spoke of the tundra as a region of hunger and privation, and some parts of the cold forest lands may also be so described. The greater part of the region, however, may be better described as one of difficulty, because it is only with difficulty that man by his labour can obtain the means of life. But towards the southern margins, where agricultural and pastoral occupations can be carried on in the forest clearings, the region improves and human life is more easily supported. In some of these cleared lands manufacturing industries have been introduced, and it is in these places that most people are to be found to-day.

It should not be assumed that these two great belts are the only areas of coniferous forest. In south and south-east United States there are exten-

FIG. 20.—MAP OF THE CONIFEROUS FORESTS OF EURASIA



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sive areas along the coastal plains where the soil is sandy, and instead of the broad-leaved trees usually found in those latitudes, conifers predominate owing to the relatively poor character of the soil. Lumbering is extensively carried on, and large quantities of tar, turpentine, wood-alcohol, and resin are obtained. Savannah, in Georgia, exports great quantities of these products. Similar soil conditions give similar results in other parts of the world, e.g. in south-east England pines and firs are found on the areas where Bagshot, Woolwich, and other sands occur.

Coniferous forests of great extent and economic importance are also found on mountain slopes in warm and hot latitudes in most parts of the world. The effect of altitude is to reduce temperature by approximately 1° F. for 300 ft. of ascent. Therefore, even in equatorial regions, coniferous forests clothe the upper mountain slopes. In the Alps the coniferous forests are naturally found at lower altitudes than in the Himalayas. Fig. 21 shows the vegetation belts on the southern slopes of the Himalayas, where coniferous forests appear at an altitude of about a mile and a half. From this diagram it will be seen that somewhat the same changes in natural vegetation are experienced in ascending a very high equatorial mountain as occur in a journey from the Equator to the poles. This statement must be taken very guardedly, for we shall later be able to see that the temperate and tropical grasslands, as well as the hot deserts, are missing. It must also be clearly understood that mountain vegetation has no uniform pattern all over the world.

These mountain coniferous forests are of great importance to mountain peoples, who hunt the animals living in the forests, and who make their houses and household utensils and furniture of the wood found close at hand. In many places, e.g. in southern Germany, charcoal-burning and

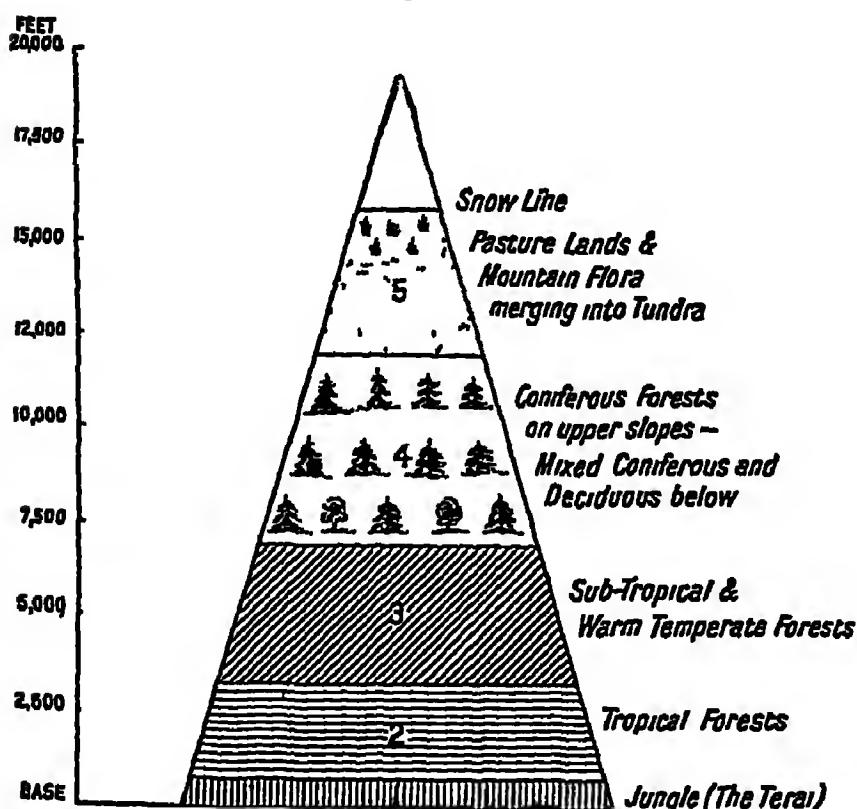


FIG 21.—THE BELTS OF VEGETATION FOUND AT DIFFERENT LEVELS ON THE SOUTHERN SLOPES OF THE HIMALAYAS

toy-making are also carried on, whilst in such places as Norway and Switzerland the presence of waterfalls, from which hydro-electric power is obtained, has led to highly organised lumbering occupations, including the manufacture of all kinds of wooden articles as well as pulping for the manufacture of paper.

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EXERCISES

1. On a map of North America find out how many miles the coniferous forest belt stretches from east to west and its approximate average extent from north to south. Compare this with the Eurasian forest.
2. Read Longfellow's "Hiawatha," and write out passages which appear to you as particularly suitable for illustrating forest life and activities.
3. Find out from your history-books all you can about the Hudson Bay Company. Mark its trading stations on a map, and write down what you notice about their sites.
4. What industries other than lumbering are carried on in the cold forests of North America?
5. Write a short essay on "The Production of a Modern Newspaper from Forest to the Printing Stage."
6. The most useful means of travel to the trapper of North America are snow-shoes and the canoe. Why?

CHAPTER V

LANDS OF BROAD-LEAVED FORESTS

THE coniferous forests about which we learned in the last chapter are found in the colder lands of the temperate zone. Where the temperature conditions are more genial and the rainfall is fairly abundant, trees of a different kind predominate. Thus the natural vegetation over the greater part of a belt of country stretching in a west and east direction across Europe is broad-leaved deciduous forest. The belt stretches from southern Scandinavia to northern Spain in the west and narrows to a point in eastern Russia, where it forms a wedge between the coniferous forest to the north and the grasslands to the south (see Fig. 22). This belt includes the greater part of the British Isles, France, Belgium, Holland, and Central Europe. It contains many plateaus and mountainous areas where, as we learned in the last chapter, vegetation belonging to a colder type of region will be found. There are also many regions of marsh and swamp, as, for example, the famous Pripet marshes; others where sandy or poor soil is found, and in those, too, we shall not expect to find the characteristic vegetation of the richer lowlands and plains.

The greater part of the belt presents, in its natural condition, a park-like landscape of broad-

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leaved trees which shed their leaves in the autumn, and are therefore known as deciduous trees, interspersed by meadow-lands (see Fig. 23). Over most of the region, however, the trees have been cut down, so that the forests exist to-day only in samples. Oak, maple, aspen, sycamore, ash, birch, elm, poplar, and beech are the chief trees. Where



FIG. 22—THE BROAD-LEAVED DECIDUOUS FORESTS OF EUROPE

the beech predominates, the closeness of the trees, aided by the dense mass of foliage in their upper portions, almost shuts out the light and forms, on the ground-level, a dim vault. There is thus little undergrowth in a beech forest, although just before the leaves appear in the spring the ground is often a beautiful carpet of primroses, wood-hyacinths, and white anemones.

In England beech forests thrive on some of

the chalk uplands, and in the High Wycombe district their presence has led to the development of a chair-making industry. On the Continent there are much larger beech forests. Consult the map of Rumania in your atlas and you will find a Carpathian district called Bukovina, a word which means "beech-land." Here, as in many other beech forests, there are large numbers of pigs which feed on beech-nuts. Pigs are also reared in oak forests, where they eat acorns. Where oaks predominate, the forests are more open, more irregular, and the light has no difficulty in penetrating to the ground. Oaks are more sociable than beeches, and we generally find other varieties of broad-leaved trees among them, as well as a mass of undergrowth of small trees, plants, and shrubs. Where the ground conditions are inclined to be marshy, trees such as willows, aspens, birches, alders, and poplars usually predominate.

All the trees we have mentioned have larger leaves than the conifers. The leaves of a plant have delicate parts from which the moisture taken in by the roots and not required by the plants is passed on to the air. If the comparatively large leaves of deciduous trees did not fall in the autumn, too much transpiration would take place during the winter and the trees would die. In broad-leaved forests, therefore, where the trees renew their leaves each year, the seasonal changes are most marked. Winter is the resting season. In spring the flowers and the young leaves herald the fullness of summer, which in turn yields to mellow autumn with its wonderful hues.

Long before the days of written history, when

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the area shown in Fig. 22 was largely covered by untouched forests, these forests were avoided by man. He had only stone implements and weapons, so that felling trees was a long and tedious occupation. Therefore he usually made his home on uplands where trees would not grow, perhaps because the position was too exposed or because it was composed of a porous rock like chalk or



Photo by H Camburn

FIG. 23.—A TYPICAL SCENE IN A BROAD LEAVED WOODLAND DISTRICT OF S.E. ENGLAND

limestone. In the course of time he acquired the skill to make knives and axes of iron, and with these he began his attack on the forest, where he made clearings for himself, his family, and his animals. Here he soon found conditions more favourable and life easier, so that the clearings grew larger and larger as the family grew in numbers.

The European forest dweller thus became a settler, and although animals could provide him

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with food, and with fur and skins for articles of clothing, although he could fish in the rivers and build strong and substantial houses by utilising the timber supplies close at hand, he had always to face the problem of provision for the winter, when berries and wild fruits were rare. This problem the forest settlers solved by the discovery of agriculture. They learned how the rich forest soil could be made to yield a harvest of plants giving food which could be stored for winter use. They also discovered how to spin the wool they obtained from their sheep and thus to make better and warmer clothing. They discovered how to tan leather and make jerkins or jackets both for warmth and for protection against the arrows of enemies who might attack them. The introduction of all these things revolutionised life in the forest and sent the dwellers in the forest clearings farther up the ladder of progress towards civilisation.

As time went on the clearings grew in size and the settlements became self-supporting villages which gradually approached each other as the area of forest diminished. The men of these communities met in conference to discuss the sharing-out of the land owned in common by all, the number of animals each man should keep, and generally to conduct the business of the village or township, even, on occasion, to decide whether to make war on a neighbouring settlement. When Julius Cæsar visited Britain and Germany, this was the kind of life he found there. How different it was from the wonderful temples, palaces, baths, streets, and houses in Rome, his capital !

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Cæsar also found that the people who lived along the coastlands and rivers were skilled boatmen as well as farmers. Boatmen and farmers the men of western Europe have remained. The giant ships of to-day and the marvellous agricultural machines now used in farming are totally unlike the boats and the implements of the men of the days of long ago. Moreover, modern man has discovered many other forms of livelihood. Nevertheless, it is true to-day as it was then, the men of western and central Europe are renowned for their skill as farmers, ship-builders, and sailors. It is also in these lands of the forests of the leaf-fall, and in similar lands in America, that we find the highest stage of civilisation yet attained by mankind. It is not to be wondered at, therefore, that both before and after the days of coal and iron and of large-scale manufacturing industries based on those articles, the commercial and political activities of the large populations of this region gave them not only world-wide trade, but world-wide empires.

Later in this book we shall have to return to study the great industrial developments just mentioned, but before we leave the European broad-leaved forest region, we must learn something of its modern agricultural activities. The chief cereals grown are wheat, barley, oats, and rye. Wheat is extensively grown in eastern England, in northern and central France, and in southern Germany. In Scotland, in Scandinavia, on the coastal plain of Belgium, in Holland, and in northern Germany barley, oats, and rye become more important. Oats are largely used in the rearing of horses, for which some parts of

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Holland and Belgium are famed, while in Holland some of the rye is used in making gin (" Hollands "). Along the plains from north-eastern France eastwards to Russia flax and beet are also important

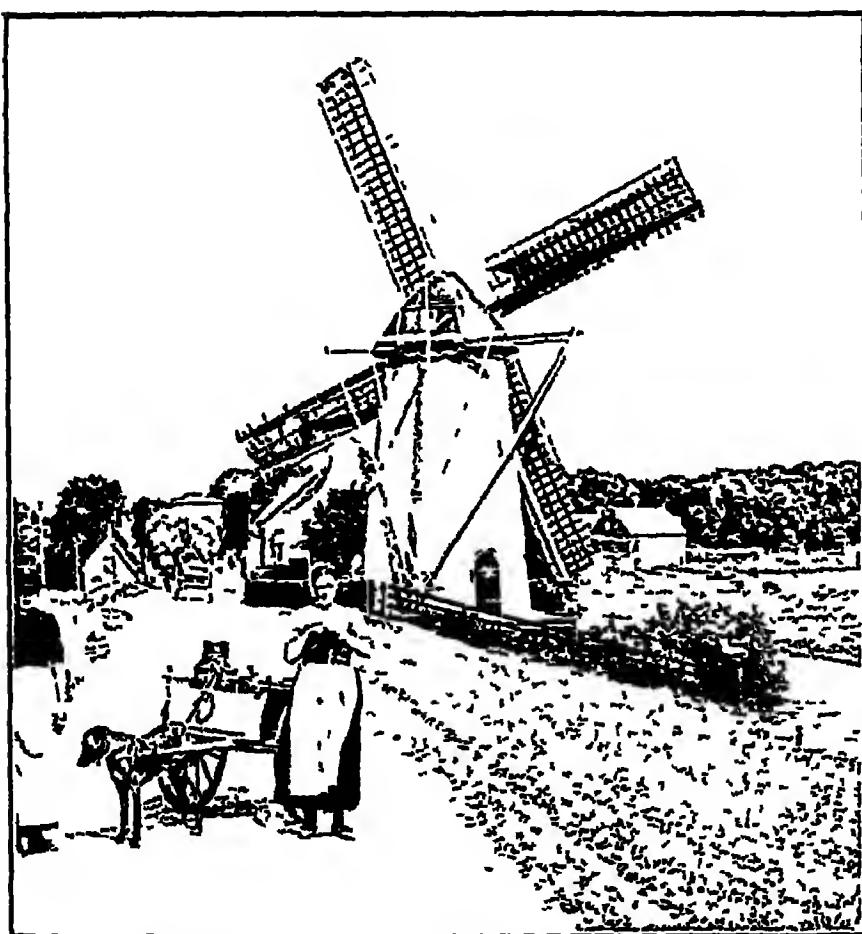


Photo by Underwood Press Service

FIG. 24.—A DUTCH PASTORAL SCENE
The road is on the top of a dyke The trees are broad-leaved

products. The flax is extensively manufactured into linen goods at such centres as Cambray in France, Courtrai in Belgium, and Haarlem in Holland, where " brown holland " is made. From the beet, sugar is extracted in many towns, but

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Magdeburg, a German city on the Elbe, and Frankfurt, on the Oder, are particularly noted for this industry.

In Ireland, western England, northern France, Belgium, Holland, Denmark, southern Sweden, and north-western Germany, dairy-farming is a very important occupation. In most of these areas, and especially in Denmark, this industry has reached a state of high efficiency. The Danes have applied scientific knowledge and principles to farming, and by that means, as well as by the development of co-operative farming, and sound, practical schemes of technical education, they have saved their country from ruin. About fifty years ago the Danes were largely employed in growing grain for home supplies. The development of the rich prairie lands of North America threatened their country with ruin, for neither the very humid climate nor the poor soil of Denmark helped the Danes to compete on equal terms. So they deliberately turned their attention to the production of milk, cream, cheese, and butter, and to the improvement not only of the animals themselves, but of the handling and marketing of the products. The Danish dairying industry is really very much like a manufacturing industry, in which the animals are the machines, the imported cake and other cattle food are the raw materials, and the milk, butter, cheese, etc., the finished articles. England is Denmark's chief customer, and in exchange sends coal, food, machinery, and textiles.

Cork and Waterford in Ireland, Copenhagen and Esbjerg in Denmark, Goteburg in Sweden, Rotterdam in Holland, Antwerp in Belgium, and

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Havre in France are all noted for their export of dairy produce.

The countries of western Europe also enjoy a rich harvest of the sea, for the sinking of the land

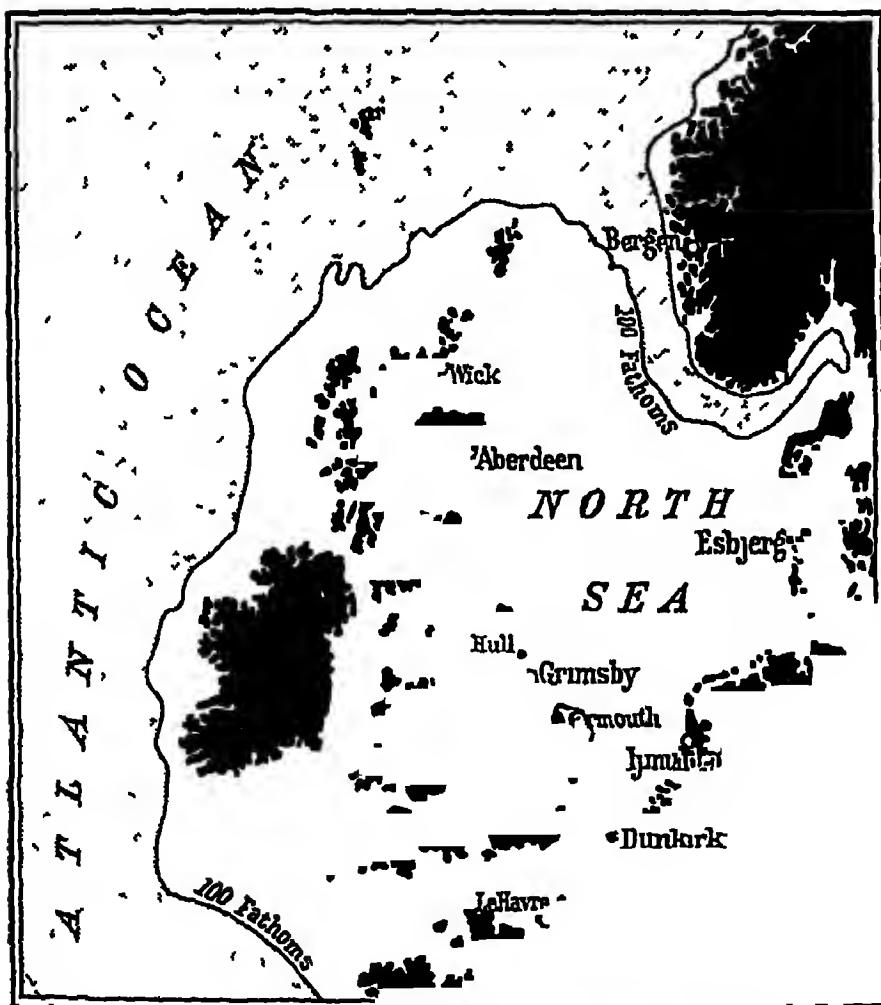


FIG. 25.—THE FISHING GROUNDS OF WESTERN EUROPE

has produced an extensive *Continental Shelf* which contains the richest fishing-grounds in the whole world. Such towns as Aberdeen in Scotland, Hull and Grimsby in England, Dunkirk in France, and Ijmuiden in Holland, send trawl fleets to the Dogger Bank. It is a long contact with the

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sea, a contact extending over thousands of years, that has helped to make Englishmen, Dutchmen, Frenchmen, and Scandinavians, including Danes, the finest sailors in the world.

Let us now turn, very briefly, to the North American region of lands of the broad-leaved deciduous forest. It is situated in the south-eastern part of the continent. In the belt roughly comprising the New England States, and the basin of the Great Lakes and the St. Lawrence, there are forests of mixed coniferous and deciduous trees, the former predominating towards the north, the latter towards the south. To the north of this belt lie the coniferous forests. Immediately to the south broad-leaved trees which shed their leaves in winter predominate, and this, of course, is the region most comparable with the European region we have studied. Farther south still, in the states bordering the Gulf of Mexico and the southern Appalachians, broad-leaved forests remain the characteristic vegetation, but the trees are no longer deciduous, that is, they do not shed their leaves in autumn, for the more genial weather conditions enable them to have foliage all the year round. They are "evergreens," though of a different kind from the coniferous trees of the north.

Some notable exceptions occur in these deciduous and evergreen broad-leaved forests. The long mountain uplift of the Appalachians is responsible for a southern prolongation of the colder forests of the north right into the "broad-leaved" region of the south. We have already learned that the presence of belts of sandy soil in the coastal plains bordering the Gulf of Mexico and the southern Appalachians

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is responsible for the prevalence of conifers in a region in which they do not normally occur.

In the "deciduous" areas of the broad-leaved



FIG. 26.—THE TEMPERATE FORESTS OF NORTH AMERICA.

forest, beeches, maples, oaks, birches, chestnuts, and elms are found and provide an abundance of hard wood for the making of farming implements, furniture, tools, carriages, etc. As in Europe, the greater part of these forests have been destroyed by

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man, and the cleared land is now used for the rearing of animals and the growing of cereals and root crops. The north-eastern areas have largely given up the growing of wheat owing to the large-scale development of the prairie lands in the centre of the continent. Mixed farming, e.g. the production of fruit and vegetables, milk, butter, cheese, and eggs, is most important, for there is a steady demand for such products in the large industrial towns which, as in western Europe are now a feature of this part of America. We shall learn about these towns in a later chapter. Farther south, in the middle and lower basin of the Ohio, maize (partly for the fattening of pigs) and tobacco are important agricultural products. St. Louis is a great river centre of the maize belt, while Louisville, on the Ohio, and Richmond, on the James River in Virginia, are important tobacco centres.

These two areas—the European and the North American—are the chief areas of broad-leaved forests in the world. There are smaller areas in eastern Asia and along the southern shores of the Caspian and Black Seas, as well as on the eastern slopes of the Tibetan plateau, but their consideration must be left for another occasion. We have spoken of the tundra as a region of "privation and hunger," of the coniferous forests as regions of "difficulty." What name which expresses the keynote of the response of the region to the work of man can be applied to the broad-leaved forests? Shall we call them regions of "effort"? They are certainly more favourable than tundra and taiga, but even in broad-leaved forest lands

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man has to work hard and continuously, with effort, before he wins the necessities of life.

EXERCISES

1 In your history lessons you have most likely been told stories of how Saxons and English tribes lived either before or after they came to this country. Write down all that you can recall or find out from books.

2 Why is it that although broad-leaved forests may predominate over a large area, we often find within that area other types of natural vegetation?

3. Are there any forests or large woods near your home? What kind of trees are most common? Describe the undergrowth. Make careful observation of the trees and undergrowth at different seasons of the year.

4. Why is it that the peoples of western Europe have always been noted as sailors and farmers?

5. Give some account of the progress made by Danish dairy-farming during the last fifty years.

CHAPTER VI

TEMPERATE GRASSLANDS

IN this chapter we shall study the regions of temperate grasslands. We know that in most cases an annual rainfall of over 25 in. is sufficient to produce forests. Where the mean annual rainfall is less than 10 in. we usually find deserts, whilst in regions of light rainfall the natural vegetation is generally grass or low shrubs and herbs. Grasslands are of two types, tropical and temperate, according to the temperature conditions. In this chapter we shall consider the distribution of temperate grasslands. This is shown in Fig. 27, in which the outline of the world has been drawn on a network of lines of latitude and longitude which enables us to compare the area of one region with that of another.

If you compare Figs 8 and 27 you will see that, except in the case of South Africa, all the regions of temperate grassland are lowlands and that they are, in most cases, interior lowlands. Interior lands in the temperate zone have an extreme climate, that is, they are very warm in summer and extremely cold in winter. This is due to their distance from the ocean, which in winter is warmer than the adjacent lands and in summer is cooler, so that the ocean winds raise the temperature of

land bordering the ocean in winter, and reduce it in summer. Therefore, we speak of the climate of ocean margins like western Europe as "oceanic," while that of interior lands like the steppes of south-east Russia is "continental." Moreover, because the winter temperature is much lower over the land masses than over the seas in the same latitude, the air over the land is colder and heavier

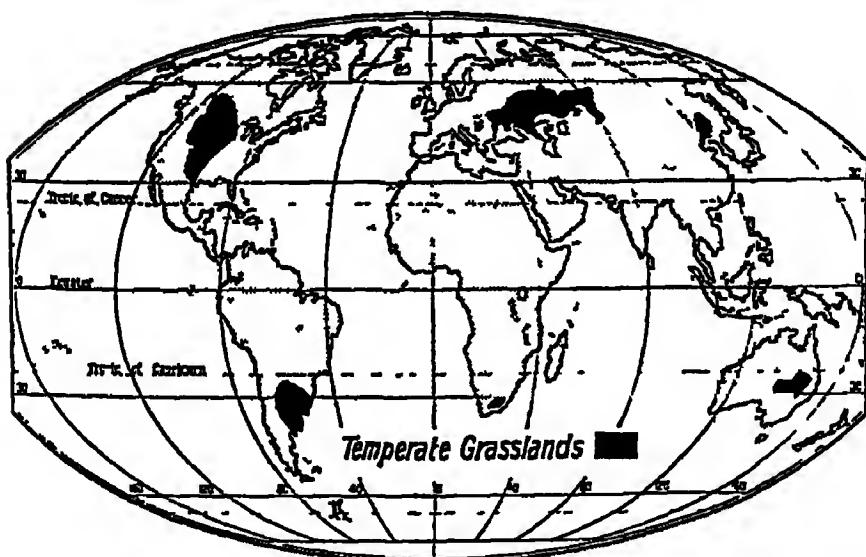


FIG. 27.—THE TEMPERATE GRASSLANDS OF THE WORLD

than that over the oceans. In summer these conditions are reversed. Thus it is that in large land masses the general movement of air in winter is from land to sea, and in summer from sea to land. From this it follows that most of the rain received by interior lowlands will not only fall chiefly in summer, but will be small in amount. Most rain falls on the coastal margins, especially when behind them rise highlands and plateaus, as, for example, in North America and parts of Asia.

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The rainfall of the continental regions is not sufficient to keep the soil moist at all seasons, and, therefore, trees are not generally found except near water-courses. The growing season is confined to the summer months, so that the kind of vegetation best adapted to go through the whole cycle of its existence in a single season—from seed to plant and flowers, and thus to seed again—will be found here. This, of course, is grass, although there is also an amazing variety of flowering plants and bulbs. The seasonal changes in the vast Asiatic and North American grasslands—the green of late spring and early summer, the brown of late summer and autumn, the snowy mantle of winter, and the carpet of bulbous flowers in early spring—form a most enchanting cycle of changes. And these changes are not confined to the vegetation, for, in autumn, migratory birds fly away to warmer climes and remain there until early spring. Winter sleepers—newts, frogs, lizards, hedgehogs, and snakes—that have remained in burrows and other winter quarters, awake with the spring and become once more active, like those larger animals which are either careless of winter or know how to survive its terrors.

We shall now study each of the major temperate grasslands in turn, the *steppes* of Europe and Asia, the *prairies* of North America, the *pampas* of South America, the *veld* of South Africa, and the Australian grasslands of the basin of the Murray-Darling.

In Europe and Asia the steppes stretch from the coniferous forest in the north to the central deserts in the south, from Lake Baikal in the east to the Carpathians in the west, with a western outlier

in the plains of Hungary, and an eastern outlier in the plains of Manchuria. Let us learn something of the lives of the steppe-dwellers living on the Asiatic borderlands of south-east Europe. The majority are shepherds who rear herds of sheep, camels, horses, goats, and cattle; and because the grass in a particular place is soon exhausted, animals and men have to move from place to place. Thus the steppe shepherd, like the tundra hunter, leads a nomadic life. It is necessary, therefore, that the house, furniture, and household utensils should be of a simple and light character, so as to be moved with ease and comfort. The people live in tents which are usually round in shape (see Fig. 28). The framework is made of willow sticks obtained from the banks of rivers. The sticks are made into a lattice-work which can be expanded or contracted according to the size desired. This lattice-work is then covered with skins or felt, and the whole held together by cords or bands. The only furniture consists of carpets, cushions, and rugs, whilst most of the household utensils are made of leather or wood, since articles so made are not easily broken. The tents can be made very comfortable indeed; they are certainly a great deal more comfortable than those made by people of the tundra.

The winter houses are more durable, and are sometimes built of stone. As the winters are usually severe and often snowy, stables have to be erected for the animals, which are fed upon hay that has been stored for winter use. The site of the winter dwelling is very important, for it must be near to a reliable water supply, and in as shel-

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tered a place as possible. Therefore a river valley is often chosen. We have said that steppe-dwellers are nomads, but one point must be noted. In however many places the summer tent is pitched, it is very seldom that the shepherd does not return to the same winter quarters. Although the chief work is looking after the animals and keeping them from any harm, some hunting is usually possible



Photo from "Asia"

FIG 28—THIS PHOTOGRAPH SHOWS A MONGOLIAN ENCAMPMENT
The people are feasting after a Sports' Day Note the type of tent

in winter, as at this season the hungry animals of the forest venture farther south in search of food.

As a general rule, steppe-dwellers despise a settled life, and glory in their nomadic existence. Their flocks and herds provide them with all they require, and therefore they are content. The felt for the tent covering is made from wool. The hair of the camel is woven into camel's-hair cloth. Wool and hair are also used in the making of the cushions, rugs, and carpets, which are noted all

over the world for their beauty of design and the excellence of the work. Leather and skins can be obtained very easily, and are made into bottles and clothing. Milk, cheese, butter, and flesh form by far the most important food, although other things can be obtained from the occasional trading caravans which carry on commerce with the steppe-

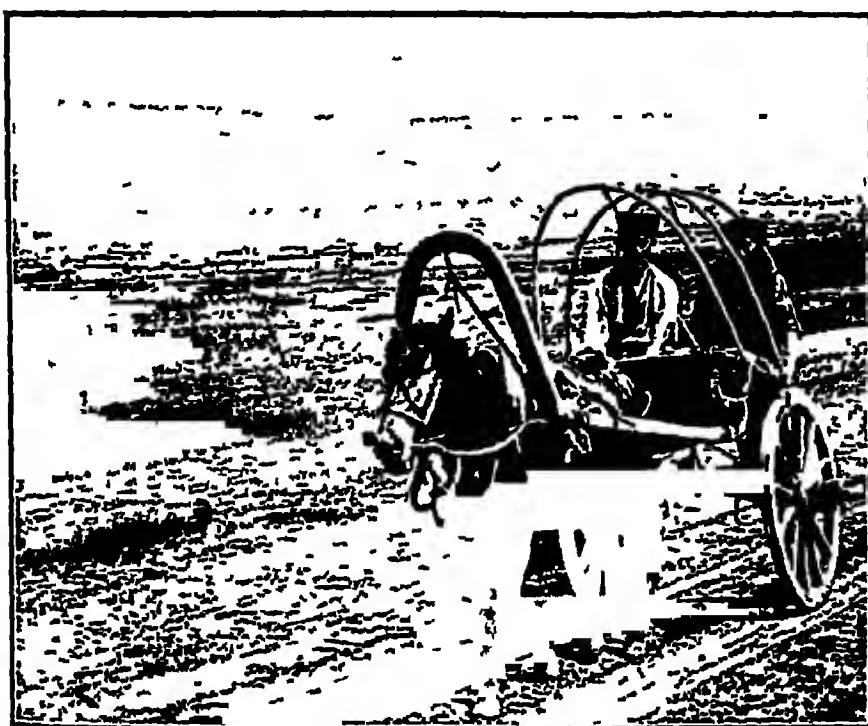


Photo by Underwood Press Service

FIG. 29.—A STEPPE SCENE NEAR WINTER QUARTERS

dwellers. The favourite drink, koumiss, is made from the fermentation of milk.

When we consider that the people are constantly moving in summer, we see that the camel and the horse are very important indeed as beasts of burden. Steppe-dwellers are noted horsemen. The Kirghiz give themselves the name Kazak, which means "horsemen." Without the help of horses it would

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be impossible to keep the flocks in order whilst moving from place to place, or to prevent them from straying during a temporary halt. Even the children are expert riders, and they are taught to ride horses and camels at the early age of four or five.

In most other occupations, the introduction of machinery has made great changes, but shepherding is still carried on in much the same way as in the days of the Bible patriarchs. Since there is little or no change, steppe-dwellers are opposed to everything new, and are very much attached to tradition. The unit is the family, and because the wealth of the family is reckoned by the number of animals possessed, we find that the families are very large. The head of the family is an autocrat who is a law unto himself, and is obeyed by all. Again, since wealth consists of livestock, drought or severe winters, storms or disease may reduce the richest of men to poverty in a short time. Such a disaster has always to be reckoned with, and it has the effect of making steppe-dwellers fatalists, for no action of theirs can avert these unforeseen disasters.

The northern portion of the steppe is arable land—that is, it may be cultivated. It is in this region that great changes have been made in recent years. People from places where a higher civilisation than a pastoral type has been reached have settled and brought with them the knowledge of the use of machinery, of irrigation, of the digging of deeper wells. In short, the modern dweller in this part of the steppe knows how to live a settled life. Russian colonists are now raising enormous

crops of wheat, oats, rye, and root crops, for the soil is very fertile and the rainfall generally sufficient, although dangers such as long droughts and early frosts are by no means unknown. Cattle are also



Photo from "Asia"

FIG. 30.—A MONGOLIAN BOY RIDING A CAMEL

reared in large numbers, and the manufacture of butter, introduced by the Danes, is to-day one of the chief industries in Siberia. As more and more areas are developed and used for stock-keeping, dairy farming, and the growing of cereals,

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the nomadic Kirghiz, who cling to their old mode of life, are being pressed farther south towards the less fertile parts of the steppe.

The construction of railways has led to rapid progress. From Petrograd the railway crosses the plain of Russia in Europe, passing through Moscow and Samara. The Urals do not present a serious obstacle, for the gradients are not difficult, and a convenient gap, south of Yekaterinburg, can be used. By means of easy descents, the line reaches the steppes of south-west Siberia, and crosses the Irtysh, an important tributary of the Ob, at *Omsk*. This rising town, often called the "Capital of the Steppes," is the centre of a rich, black earth region in which wheat-growing, dairy-farming, and stock-keeping are important occupations. It is the most important town in the agricultural area of Siberia. From Omsk the railway continues eastwards, and after sending a branch line to Tomsk, a rising Siberian city noted for its gold-mining, it soon leaves the steppes for lands of coniferous forests.

These great nomad lands in the heart of Eurasia have affected the history of most of the surrounding lands, for from time to time they have sent out waves of invaders. The Mongols and Manchus in China, the Turks in Asia Minor and Europe, the Magyars in Hungary, and the Rajputs in India are all evidence of what the grasslands can do through their restless, wandering, nomadic horsemen. Indeed, just as we called the tundra a region of hunger and privation, and the cold forests regions of difficulty, so we can well describe the steppes as a region or zone of wandering and restlessness. Nevertheless, we must not forget that

man has learned to live a settled life there, and we shall see that this is even more true in other grasslands of shorter history and more rapid development in recent times.

When Europeans first went to the prairies of North America, they found them in the possession of Indian tribes who hunted enormous herds of buffalo, animals now almost extinct. Where once the Indian "brave" raced madly on horseback across the prairie, there are now farms with well-built houses and sheds, and the Indian war-whoop is heard no more. In the eastern part of the prairies, and especially in the valley of the Red River, where there is splendid soil formed long ago on the bed of a vast lake of which Lake Winnipeg is a remnant, the growing of wheat, barley, and oats is more important than the rearing of cattle, horses, and sheep, which is more extensively carried on farther west where the rainfall is less. This compares with what we saw is taking place in Siberia. Winnipeg, in Canada, and Minneapolis, in the United States, are great grain centres, while Calgary, in Canada, and Cheyenne, in the United States, are centres of ranching. It should be understood, however, that the methods of irrigation and dry farming are bringing large tracts in the drier west into cultivation.

Harvest is the scene of greatest activity in the arable prairies. The farmers are anxious not only to reap and thresh the corn, but to get it away before the winter covers the land with snow and freezes rivers and lakes. Horse- and motor-drawn reapers cut down the corn, throwing it to one side in bundles. These are then reared into "stooks,"

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so that the warm, dry weather may improve the grain. Then come the enormous threshing machines. For some distance round, the bundles of corn are thrown on to the travelling band, which carries them into the machine. Here the grain is beaten and shaken out and the chaff blown to one side by fans, while the corn flows in a continuous

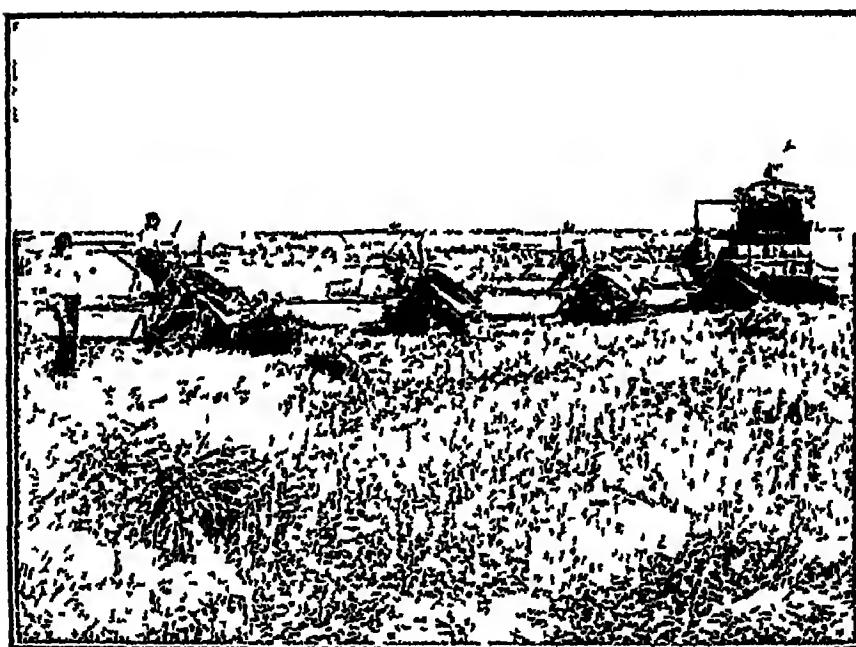


Photo by Canadian Pacific Railway

FIG. 31.—BINDERS CUTTING WHEAT IN THE WESTERN PRAIRIES
The binders are drawn by a tractor Note that they are not behind one another

stream into the sacks awaiting it. Then the thresher moves on to another set of "stooks," and so on until the harvest is gathered.

Wagons and motors carry the grain to the railway station, and the train either takes it direct to the large towns and ports of the east, or to ports on the Great Lakes. There it is placed in large buildings called elevators to be sorted and made

ready for sending off to Europe. The grain boat comes alongside the elevator and the corn flows into it. At the ocean port, perhaps Montreal, the grain boat ties up to the larger steamer which is to carry the grain across the ocean. Enormous pumps suck the corn from one to the other. The "holds" of the ocean ship are filled, only to be emptied at the wharves of London or Liverpool or Antwerp, or some other port on this side of the



Photo by Underwood Press Service.

FIG. 32.—BRANDING CATTLE ON THE PAMPA OF ARGENTINA

Atlantic. The bread you had for breakfast was perhaps made of flour from wheat grown by a Canadian farmer on the prairie lands of Manitoba.

In the western prairies cattle-rearing is still the chief occupation. In many parts the cattle can remain out-of-doors all the year round, for in the drier parts little snow falls, and the dryness turns the long grass into natural hay without the necessity of being cut. The ranches are usually of very great size, because it is necessary to allow the cattle

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to roam long distances in search of food. As a rule, the "round-up," or gathering together of the cattle, takes place only twice yearly. The first is in early summer, the object being to brand the calves born during the winter. As there are no fences, cattle from different ranches get mixed, thus making it necessary to brand them by some distinctive letter or sign in order that those belonging to different owners may be distinguished. The second "round-up" takes place in the fall, or autumn, and its object is to select cattle for killing. These are despatched by train to be slaughtered at Chicago, St. Louis, or Omaha, where canning is extensively carried on. Whilst rounding-up the cattle, or moving them from one place to another, the cowboys ride considerable distances every day, sometimes as much as from sixty to eighty miles, and frequently they are compelled to spend day and night in the saddle. It is no wonder, therefore, that they are excellent horsemen.

Great changes have also taken place in the pampas lands of South America. As in the case of the Indians of the prairies, modern developments have forced the Gauchos—tribes of mixed Indian and Spanish descent—either to follow a more settled mode of life or to retreat farther inland. The Gauchos, whose numbers are small, live nomadic lives, and tend horses, sheep, and cattle. They are exceptionally fine horsemen. Millions of cattle and sheep are now reared on the pampas lands of Argentina and Uruguay, and, as in North America and Eurasia, the better watered parts, in this case the land around the estuary of the Plate, produce wheat and maize in great quantities.

The Plate lowlands have very little coal and only a limited amount of water-power, so that it is most likely that agriculture and stock-rearing, together with industries based on these—the making of extracts, leather, etc.—will always remain the principal industries. As was seen in the case of the Trans-Siberian Railway, we find both in the prairies and the pampas that their rapid modern development has been largely due to the construction of railways. But instead of one great railway, the prairies have several east and west trans-continental lines which are all linked together into a close network. In Argentina, railways go out in all directions from Buenos Aires, the capital and chief port, and the largest city in South America. One line—the Trans-Andean—crosses the Andes to Valparaiso in central Chile. Montevideo is the capital and largest port of Uruguay, while Fray Bentos and Paysandu, on the River Uruguay, Rosario, a Plate River port, and Cordoba are important interior centres for the agricultural and pastoral industries of the pampas lands.

The veld is that part of the high plateau of South Africa lying to the lee of the Drakensberg Mountains. It comprises the greater part of the Transvaal and the Orange Free State provinces. In the wetter parts nearer the Drakensbergs maize and other crops are grown, but pastoral occupations predominate and large numbers of cattle and sheep are reared. The discovery of gold in the Johannesburg area and of diamonds at Kimberley and Pretoria has attracted a large number of white men to a country hitherto mainly peopled by

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Bantu negroes and a relatively small number of the descendants of Dutch settlers.

The temperate grasslands of Australia have no distinctive name. They are found chiefly in New South Wales, in the basin of the Murray-Darling, where sheep-rearing is the most important occupation. The rainfall decreases from east to west, and

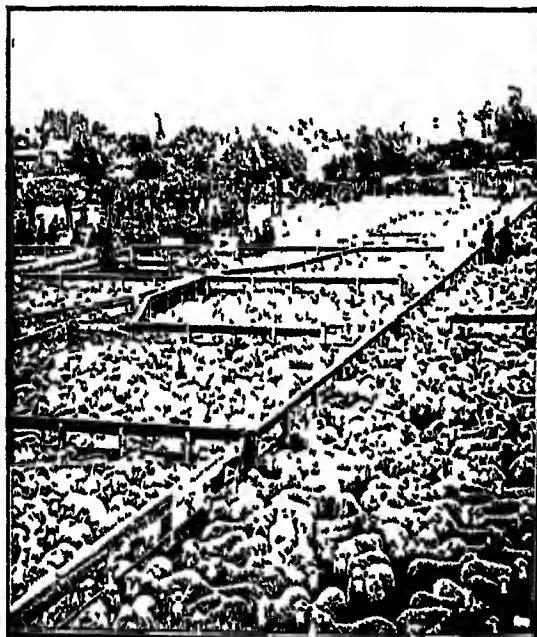


Photo by New Zealand Government Office

FIG. 33.—A SHEEP SALE ON THE CANTERBURY PLAINS OF NEW ZEALAND

the number of sheep per 1,000 acres is four times as great in the east as in the west. The west has very few places suitable for agricultural occupations which have made rapid progress in the east, where wheat-growing is now very important. Great progress in agricultural development has taken place in the *Riverina*, the land between the Murray and the Murrumbidgee, although even here the

rainfall and the water available from the rivers must be supplemented by that obtained from artesian wells. Sydney, the chief port of New South Wales, exports most of the wool, frozen mutton, wheat, and flour obtained from the temperate grasslands of New South Wales.

There is a small area of temperate grassland on the east of the South Island of New Zealand known as the Canterbury Plains. It is noted for its export of wool and frozen mutton.

Summarising what we have learned in this chapter, we see that the temperate grasslands are, in their first stage of development, great ranching areas where cattle, sheep, and horses can be reared in great numbers, and from which hides, skins, tallow, meat, wool, and hair form the chief products. Agriculture is a more profitable use of land, and the large-scale production of temperate cereals now occupies the best lands in every one of the regions, so that they are rapidly becoming the "Granaries of the World". Manufacturing is at present chiefly restricted to the making of agricultural implements and the preparation of extracts.

EXERCISES

- 1 What determines whether a region is grassland, forest, or desert?
- 2 Compare the industries of the modern prairies and pampas with those prevailing a hundred years ago
- 3 Wheat and mutton are exported in great quantities from Australia and New Zealand to England. What methods have made this possible?
- 4 From which parts of the world do we chiefly import (a) meat, including mutton, (b) wheat? Why is it necessary

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for us to import large quantities of these goods, and why is it that these countries can supply them ?

5. Find out some dry grassland areas which have been opened out to agriculture owing to the introduction of irrigation methods. Describe how the irrigation is carried out.

6. Should railway development in each of the temperate grasslands precede or follow agricultural development ?

7. Describe a typical day in the life of each of the following. (a) a cowboy during the branding round-up ; (b) a Kirghiz boy during a migration from one spot to another ; (c) a harvester in Manitoba.

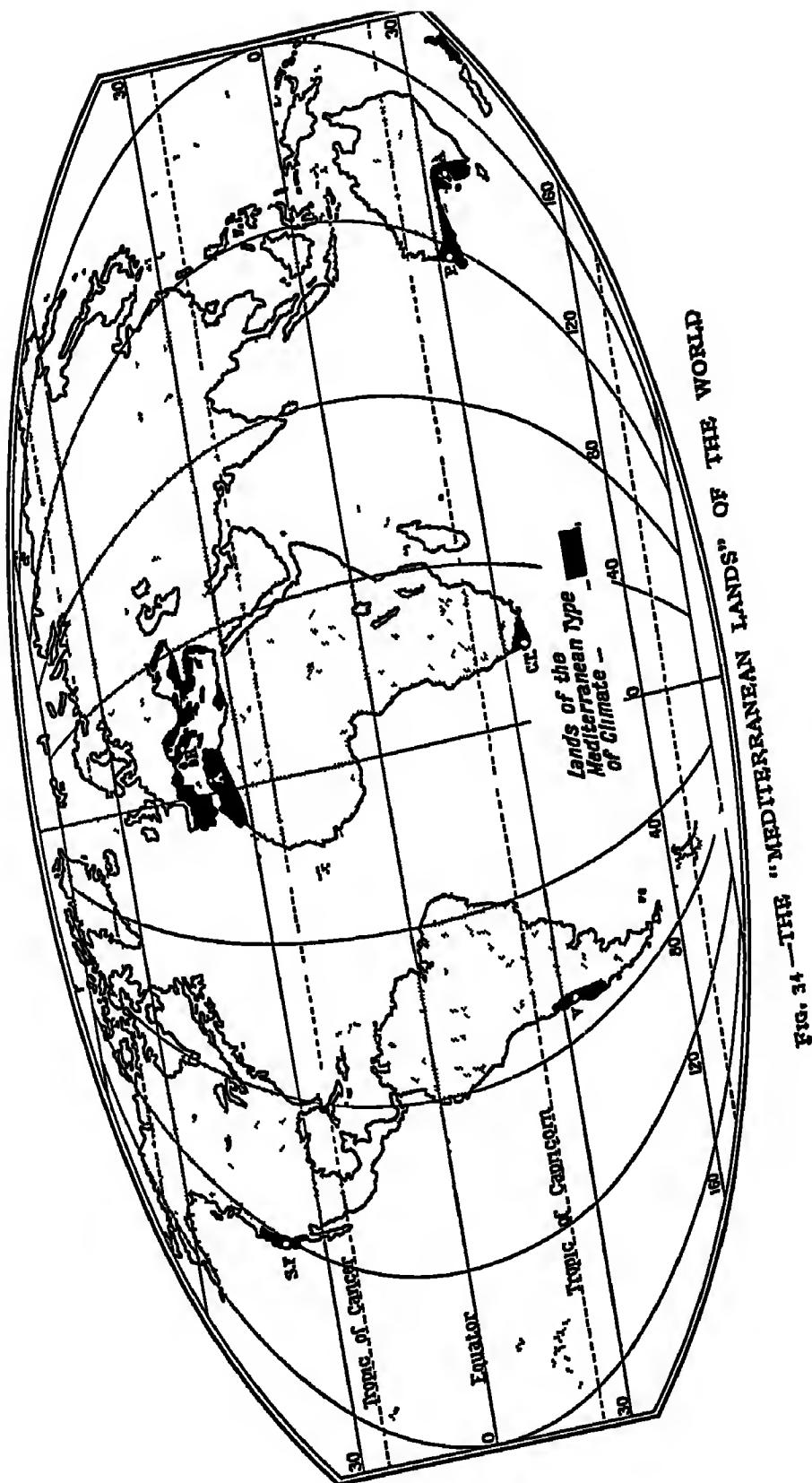
8. Find out where the ranches and slaughtering centres of the proprietors of "Bovril" and "Liebig's Extract of Beef" are located ? Why are they in those places ?

CHAPTER VII

MEDITERRANEAN LANDS

IN this chapter we shall learn a little of life in some of the most pleasant lands of the earth. You have all heard of the sunny skies of Italy, of the open-air life of sunny Spain, of the mild winter of the Riviera, of the orange groves of Sicily, the olives of Palestine, and the wine of all of these lands. The lands bordering the Mediterranean Sea have a climate which is warmer all the year round than it is in England. But it is not so much the temperature conditions which distinguish what we must learn to call the "Mediterranean" climate, as the seasonal distribution of the rainfall. The lands bordering the Mediterranean Sea have remarkably dry summers, hence the blue skies. Most of the rain falls in winter. To the south of these lands there lies the hot, dry Sahara Desert ; to the north the lands of western Europe with their equable climate and rains at all seasons. The Mediterranean lands partake of the nature of both their neighbours. In summer they are very warm and dry, and approximate more to the climate of their southern neighbour, while in winter they are mild and wet like their northern neighbour.

Later on we shall be able to explain the reason for this. For the present it will be sufficient to

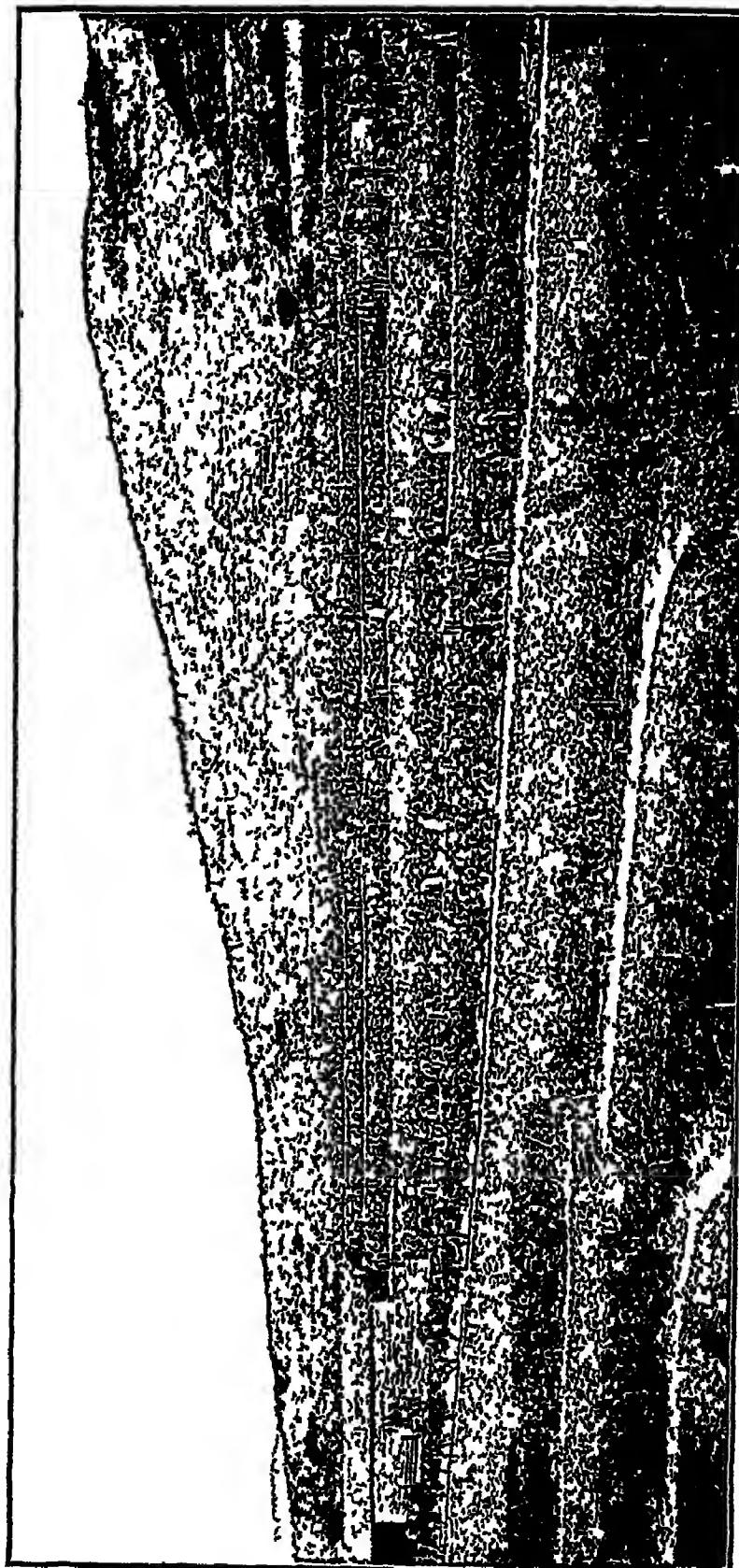


state that just as the inclination of the earth's axis causes the vertical sun to appear to migrate between the tropics, so this results in the migration of the wind, temperature, and rain belts. The Mediterranean region comes within one set of climatic influences in summer and another in winter, hence the "transition" character of its climate.

Now the plants and trees of a region of very warm dry summers and mild wet winters will undoubtedly be adapted for life in such conditions. Some, like the olive, have small dry leaves, and others, like the laurel, have leathery leaves. Some develop spines and prickles. These devices prevent moisture from escaping too readily. Many trees are not very tall, so that their leaves are near to the ground, where the air is generally damper. Some of them, like the cork oak, have a thick, rough bark, which, like the leathery leaves mentioned above, is a protection against excessive perspiration, whilst others either have long roots that go deep into the soil in search of moisture, or thick fleshy roots which act as storehouses during the dry season.

The Mediterranean trees and shrubs have no need to shed their leaves in winter, hence they are evergreens. The principal specimens are oaks, walnuts, chestnuts, figs, laurels, olives, and many kinds of conifers, especially cedars, cypresses, junipers, pines, and firs. There is a striking absence of the grassy meadows so plentiful farther north. This is more noticeable in late summer than in winter and spring, for by that season most of the grass has been scorched up by the sun's heat. The result of this is that in the Mediterranean

Photo by W. & A. Gilley, Ltd.
FIG. 35—THIS PHOTOGRAPH OF A PORTUGUESE VINEYARD SHOWS HOW THE VINES ARE GROWN ON THE TERRACED HILLSIDES



lands there is a scarcity of cattle and hence of butter and cheese. Olive oil is a common substitute for butter. Animals like goats and sheep are found, for they can manage to exist on poor, scanty grass.

A wonderful variety of fruits is found. The long, dry summers are suited to softer kinds.



Photo by W & A Gilbe, Ltd

FIG 36—WORKERS BRINGING IN BASKETS FULL OF FRESHLY GATHERED GRAPES

This photograph was taken in the same vineyard as Fig 35

They also permit the ripened fruit to be dried in the sun. Mulberries, vines, oranges, olives, lemons, figs, peaches, apricots, and pomegranates are all cultivated with success, and industries such as the manufacture of wine, oil and soap (based on olives), and silk are very important in some parts of the area. The silkworms are usually fed on the leaves of the mulberry.

The forest trees are, however, chiefly confined to the wetter mountain slopes—the western part of the basin—and the fruits to the cultivated gardens and fields. Apart from these, the characteristic Mediterranean vegetation is an evergreen scrub of dwarf, leathery, and aromatic shrubs. They are aromatic owing to a device for covering themselves with an annual coat of varnish which they exude in order to close their pores and thus check transpiration during the very warm, dry summer.

Thus we see that the lands bordering the Mediterranean Sea enjoy a very well-marked type of climate. So far we have only mentioned the summer and the winter. Let us notice very briefly the seasonal changes throughout the year. The winters are short, mild, stormy, and wet, and during that season all green things are growing apace—a reversal of what happens in northwest Europe. This growing season reaches its highest point in a shortened spring, brilliant with flowers and green with cornfields. Then follows the long and almost rainless summer. “The grass withereth, the flower fadeth”; “the place thereof knoweth it no more.” The corn harvest comes in June and July, and long before that, bulbs and such fibrous-rooted plants as anemones have settled down to summer rest and sleep. The deep-striking vines and olives maintain their fertility a little longer, but not so long as the evergreen scrub mentioned above.

The Mediterranean region has had a remarkable history. The fruit gardens and cornlands of its richer areas have from earliest times yielded a rich

harvest without that long and sustained effort on the part of man which is required to win the necessities of life in tundra, forest, or steppe. The almost tideless waters of the Mediterranean and the indented character of some of its coasts



Photo by Underwood Press Service

FIG. 97.—SOME OF THE MAGNIFICENT BUILDINGS OF ANCIENT ATHENS
The best known are on the hill, the Acropolis, on and around which the city grew. Note the vegetation

also encouraged man to embark on seafaring. Thus the Mediterranean has cradled such early civilisations as those of Phoenicia, Greece, and Rome, and through them has influenced the history of the world.

Fruit and corn growing are still among the most

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important occupations in the region. Seville, on the Guadalquivir, in Spain, is noted for its oranges ; Cadiz, Malaga, Barcelona, and other Spanish ports are all engaged in the exportation of fruits and wine. Marseilles, the great French port situated east of the delta of the Rhone, so that its harbour is not silted, exports wine and manufactures soap, originally from olive oil, now also from palm and other oils obtained from tropical lands. Naples is one of many Italian towns manufacturing large quantities of macaroni from the hard variety of wheat grown in peninsular Italy. Some cities, e.g. Leghorn, plait straw and manufacture straw hats and other articles from the straw of the "macaroni" wheat. Palermo, the capital of Sicily, is noted for its orange and lemon groves, and Patras, on the Gulf of Corinth, is a Grecian city famous for its currants—sun-dried small, black, seedless grapes which form the chief article of commerce of the country. Smyrna, on the western coast of Asia Minor, and Algiers, on the coast of Algeria, in north-west Africa, also export Mediterranean fruits and wine.

Silk goods are manufactured and exported from Murcia and Valencia in Spain, Lyons and Marseilles in France, and Milan and Turin in Italy, while Barcelona, in Spain, is a very important centre for the manufacture of imported raw cotton. Indeed, manufacturing is becoming more and more important both in Spain and Italy.

Now study Fig 34. It shows the parts of the world where the general features of the climate of the lands bordering the Mediterranean are repeated. Their position should be noted very

carefully. In the first place they are all in approximately the same latitude north and south of the Equator, and secondly they are all on the western margins of land masses. All have winter rains, because at that season the prevalent winds blow from the west, i.e. from sea to land. In summer the conditions are reversed and the winds usually blow from the east, i.e. from land to sea. That is why the summers are dry. All the "Mediterranean" lands, with the exception of the lands bordering the Mediterranean Sea itself, are comparatively "new" lands, and it is interesting to notice that all are largely peopled by men and women of European descent. They are white men's lands of a particularly favourable type. Let us study each of them in turn. We shall find that man has taken advantage of their similarities in climate by transplanting several useful plants from one to the other, e.g. the olive tree is now



Photo by Realistic Travels, Ltd.

FIG. 38.—MACARONI DRYING IN THE SUN AT
A SMALL TOWN NEAR NAPLES

found in most of them and all produce and export wine.

The North American "Mediterranean Land" is situated along the west coast between the deserts of the basin of the Lower Colorado and the north-west margins where rain falls at all seasons. It comprises the Valley of California, the plain lying between the Coast Range and the Sierra Nevadas and drained by the Sacramento and San Joaquin Rivers, together with the corresponding coastal belt. This plain has been built up by sediment carried from the neighbouring mountains by the rivers. A break in the Coast Range gives to these rivers an outlet to the Pacific, and to San Francisco, one of the finest harbours in the whole world. In the Californian valley large quantities of wheat are grown, while there are miles and miles of fruit farms where grapes, oranges, lemons, figs, apricots, peaches, and similar fruits are produced, dried in the sun, packed, and sent off to all parts of the world. The mountain-sides are clothed with gigantic conifers. You must have seen photographs or advertisements showing the Californian "big trees." One very tall tree measured 325 ft. in height; another was nearly 36 ft. in diameter 4 ft. from the ground. Compare this with the breadth of your classroom.

Gold was discovered in the gravels of the beds of Californian rivers in 1845, and this led to the first settlement of any importance. Dredgers still raise river gravel in search of gold, but most of the mining now takes place in the mountains from which, of course, the rivers derive their supplies of the precious metal. California is deficient in coal,

but it contains some of the richest oil deposits in the world. These are chiefly located in the vicinity of Los Angeles, a city noted for its wheat lands as well as its modern importance as the chief centre of the American cinematograph film industry.

San Francisco is the chief port and most important city in the region. Railways converge upon it from the east, and it is connected by steamship lines with Australia, China, Japan, and all the important Pacific ports. The Panama Canal has increased its importance very considerably. It is a beautiful city and enjoys a splendid climate.

Occupying a similar position south of the Equator we have the South American "Mediterranean Land" of central Chile. Wheat and barley are extensively grown and Mediterranean fruits have been introduced with success, especially the vine. Valparaiso is the chief port. It is the largest American Pacific port after San Francisco, and, like that city, is subject to earthquakes. Both were partially destroyed by earthquakes and fire so recently as 1906. Santiago, the capital of Chile, lies in the fertile basin between the coast range and the Andes proper. Both cities are on the Trans-Andean railway from Buenos Aires.

In South Africa we find the "Mediterranean Region" in the south-west corner. Compare its position and latitude with those regions already noted. There are few conifers in this region, but plenty of small-leaved trees and dry brush and scrub. The usual Mediterranean fruits have been introduced, wheat is extensively cultivated, and wine is manufactured and exported. Cape Town, the great half-way house between western Europe

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on the one hand, and India, the Far East, and Australia on the other, is the chief city and port. It has excellent railway facilities with the interior, and receives for export wool and ostrich feathers from the Karroos, diamonds from Kimberley, gold from Johannesburg, and many of the commodities of far-off Rhodesia. The railway which links all

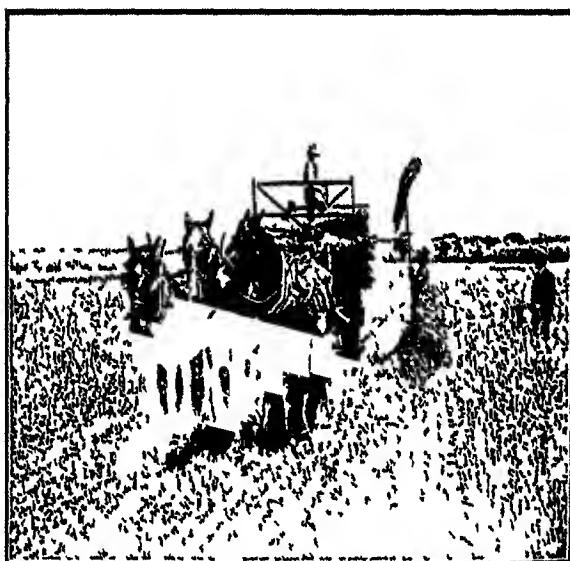


Photo by Agent-General for Western Australia

FIG. 39.—SCENE IN A WHEATFIELD IN THE S.W. CORNER OF WESTERN AUSTRALIA.

these regions is the southern half of the uncompleted "Cape-Cairo" Railway.

Lastly we come to the Mediterranean lands of Australasia. Their distribution is indicated in Fig. 34. The south-west corner of West Australia, the lands bordering Spencer and St. Vincent Gulfs, and those in western Victoria are more typical than the very dry tracts of land north of the Great Australian Bight. The south-west corner of the

continent receives sufficient rainfall for the growth of forests, and most valuable timber—the famous hard-wood jarrah and karri woods—are obtained and exported to all parts of the world for use in various construction works and in the making of wood-block pavements. The vine and other



Photo by Agent-General for Western Australia

FIG. 40.—LUMBERING SCENE IN THE KARRI FORESTS OF SW AUSTRALIA

. The tree is 110 feet in length. When the land has been cleared it may become a wheat growing area like that shown in Fig. 39. What tasks are the various men engaged in?

Mediterranean fruits have been introduced, wheat is grown, and wheat, wine, and fruits are exported. Perth, some twenty miles from the mouth of the Swan River, is the largest town and the capital of the State. Fremantle is the chief port.

In the "Mediterranean" lands of South Australia and Victoria, men and women are engaged in the

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same kind of agricultural activities. In the irrigated *Wimmera* district the natural scrub has been cleared, and to-day, wheat, vines, olives, apricots, peaches, oranges, etc., are extensively produced, and wheat, wine, and canned and dried fruits are exported. Mildura is the chief town in this important area. Adelaide, the capital of South Australia, and Melbourne, the Victorian capital, are the chief ports.

The North Island of New Zealand is sometimes classified with this group of regions. Its climate resembles that of the others in so far as the rain chiefly occurs in autumn and winter, but being an island, there is no distinctly dry season. It lies in latitudes corresponding to those of the European Mediterranean lands, and vines and some other Mediterranean fruits are successfully cultivated. Therefore these are sufficient similarities for us to think of it as belonging to the other regions we have described in this chapter.

Undoubtedly these Mediterranean lands of very warm, dry, sunny summers and mild, wet winters, these lands of sunshine, of luscious fruits and of cornfields, are the most congenial homes of man we have so far studied. They formed admirable environments for early civilisations and their peoples to-day have much to contribute to the common welfare of man. Nevertheless, in these modern days of world-wide trade and of severe competition they are almost too easy a homeland for those who would lead the world, and that position has been taken by peoples living in rather harder lands—by the peoples of western Europe and their settlers overseas.

EXERCISES

1. Why is it possible to think of all the regions shown in Fig. 34 as belonging to the same group?
2. From which book were the quotations on page 96 taken? Can you find other suitable quotations from the same source?
3. Why has Los Angeles become a great cinematograph film making centre? What advantage has it over an English town?
4. When Vasco da Gama rounded the Cape going eastwards, he encountered contrary winds and had considerable difficulty in making the east coast. When Diaz rounded the Cape some years earlier, the winds gave him great assistance. How do you reconcile these statements? Both are true.
5. How are Mediterranean plants adapted for life in their peculiar environment?
6. Make sketch-maps showing the site of each of the following cities, and in writing state what you know about the importance of each Marseilles, Rome, Athens, San Francisco, Cape Town, Perth (W.A.), Algiers
7. Why is it that there is so much open-air life in Italy and that ancient buildings are so well preserved?

CHAPTER VIII

DESERT LANDS

WE have already learned something about cold deserts, for the tundra of Eurasia and the "Barrens" of North America come within the category of deserts. In this chapter, however, we shall confine our attention to deserts of the type of the Sahara in North Africa. Their distribution is shown in Fig. 41, which brings out very clearly the fact of their position on the western margins of all the great land masses. The Sahara and its extensions through Arabia to north-west India must be looked at in relation to the enormous mass of the Old World Island—Eurasia and Africa. They are also seen to be in approximately the same latitudes north and south of the Equator. Now these two factors in their position are related to each other, for in the latitudes in which these deserts are situated the prevailing winds are the North-East Trades in the Northern Hemisphere and the South-East Trades in the Southern Hemisphere. If you examine Fig. 8, which shows the physical features of the continents, you will see that not only will winds from the east be drier on west coasts where they blow from land to sea and therefore are naturally dry, but that in nearly every case the presence of high mountains

or plateaus which must be crossed before the winds reach the west is an additional cause of dryness. East coast margins have rain, for there the trade winds blow from the sea to the land, but west coast margins in trade wind latitudes are dry. Moreover, the latitudes where the trade winds blow at all seasons are partly within and partly just

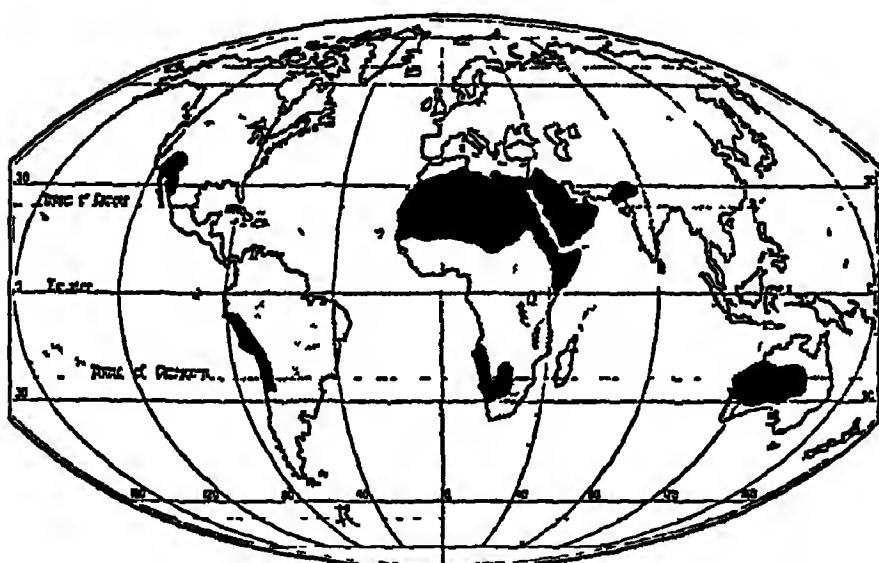


FIG. 41.—THE HOT DESERTS OF THE WORLD
In the interior of Asia there are also temperate deserts (see page 118)

without the tropics, so that they lie within the belt of hot lands.

North of the Equator we have the Colorado Desert in North America, and the Sahara, Arabian, and North-West Indian Deserts in Africa and Asia. South of the Equator there is the desert of Peru and Chile in South America, the Kalahari in South Africa, and the West Australian Desert in Australia.

Let us learn something of the vast Sahara Desert. The old notion of the Sahara as a boundless waste of shifting sand—a dried-up bed of a former ocean—dies very hard. The idea probably

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originated from the fact that the western, northern, and eastern Sahara margins are largely sandy and that these were the first parts to be seen, not only by the explorers of the fifteenth and sixteenth centuries, but by most of the tourists who visited the desert until quite recent times. The desert is as large as the whole of Europe, and it is probable that sand extends over about one-fifth of its surface. The rest is largely occupied by rocky plateaus which are far more typical of the Sahara than the sands and sand-dunes. The best generalised description of the Sahara, according to one writer, is "a vast plateau scored by the beds of dried-up rivers, diversified by mountains and depressions, and fringed by a deep belt of sand, west, north, and east." If you study a physical map, you will see that the higher plateaus and the mountain ranges occupy a central position and extend across the desert from north-west to south-east.

The summers are very hot, hotter than in the equatorial regions, the winters are very warm, and the mean annual rainfall is very slight; most rain which falls is brought by violent and sudden thunderstorms whose occurrence is uncertain and irregular. Very striking are the differences between day and night temperatures. During the day the rays of the sun pour down upon a surface unprotected by vegetation covering and cause the surface layers of exposed rocks to expand. When the sun has set, rapid radiation takes place and the nights are extremely cold. This causes contraction, and it is the continuous expansion and contracting of the surface rock layers that produce splitting

and fracturing. Rock fragments fall to the ground, the smaller fragments being carried away by the wind to be piled into sand-dunes, the larger ones for the time remaining where they fall. Finally they, too, are reduced to sand. It is in this manner that the sand of the Sahara has been produced.

Prof. Gregory has stated "Deserts are most easily produced and least curable where the rainfall is low, the temperature is high, the wind is strong, and the country consists of a plateau where there is an easy drainage to the adjacent lowlands" These conditions obtain in the Sahara, and although there are some areas where greater productivity can be obtained, it is probably true that the Sahara is one of those deserts that can never be cured by the agency of man.

The Sahara has many water-courses called wadis (= water), but very rarely are they filled with water for more than a few days. It is lack of moisture which is the great cause of the poverty of the natural vegetation. Wherever water can be found, as in an oasis, "the desert blossoms as the rose." In the Algerian Sahara the French have actually created and enlarged oases by the sinking of wells to reach underground supplies of water. It is only in the oases that settled life is possible, so that only there do we find permanent homes. The date palm, a very important food tree, and quite indispensable to the desert-dweller, is cultivated in all the oases, whilst in those whose water supply is regular, cereals, especially wheat and barley, and a wide variety of fruits, are grown.

Around the oases, and in the desert margins to

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the north and south, we frequently find coarse grasses and scrub. In such places the desert nomad finds his home. After rains he will go



Photo by Underwood Press Service.

FIG 42.—DATE-PALMS GROWING ALONG THE BANKS OF
THE BAHR YUSUF IN EGYPT

Why is this water so called? Is it a tributary of the Nile?

farther afield to get pasture for his camels and horses, but when the pastures dry he returns towards the oases. He is a nomad, but is largely dependent upon the oases, over which he usually

establishes himself as overlord. Nevertheless he seldom takes part in the agriculture or primitive manufactures (the weaving of woollen garments and the making of carpets of goat and camel hair) of the "townsman" of the oases.

The Tauregs are the best known of the Sahara nomads. One writer says of the Tauregs living in the neighbourhood of the oasis of Air : " Like most nomads, they are thieves and raiders by choice when an opportunity presents itself ; they are poor, as only people who have no possessions can be poor, but as hard and tough as any race in the world. They can travel 120 miles in twenty-four hours on one camel, and suffer extremes of heat and cold alike, clad in a thin indigo cotton robe open at the sides, worn over the usual pair of broad Moslem trousers. When grain is available they eat it : otherwise milk and cheese of camels and goats, with the seeds of the grasses of their arid mountains, constitute their diet, only varied by an occasional dish of tomatoes and onions from their gardens, when they possess any, which is rather the exception : very rarely, sweetened tea or coffee mark red-letter days in their frugal lives. They never lose their temper, and rarely get angry, and their vices are remarkably few—none, I might almost say—for they do not smoke, and they drink no fermented liquor of any sort. A passion for snuff, and the vanity they display in their personal appearance, are the principal failings ; these, with their habit of incessantly asking for presents, excusable in a nomadic people who have so little, are the worst traits in their character, and may surely be forgiven them for the honour they pay

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to their women, for the love they display to their children, and for the kindness they show to their animals."

Travel on the Sahara would be impossible were it not for the oases and the camel, the ship of the desert. The oases act as stations on the way, where provisions and water may be obtained, and the camel is the only possible beast of burden, being peculiarly adapted for walking on sandy

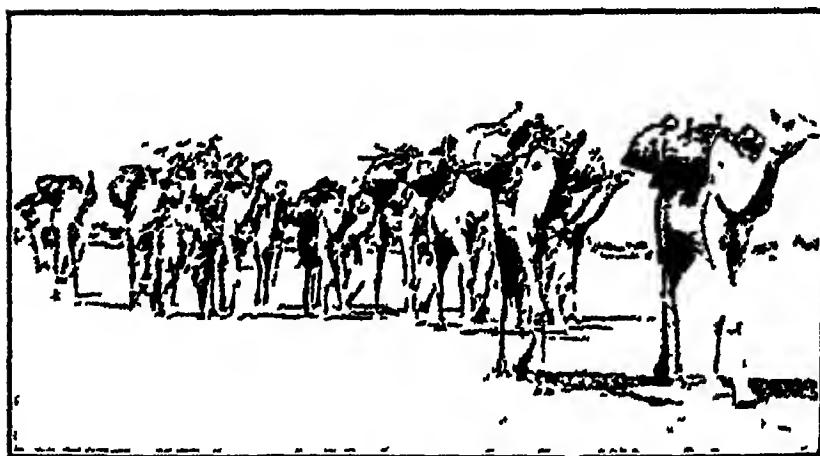


Photo by Sudan Government Railways.

FIG. 43.—PART OF A CAMEL CARAVAN SETTING OUT FROM AN OASIS ON A JOURNEY ACROSS THE SAHARA

surfaces, as well as being able to go without food and water for a few days. A journey across the Sahara from the Mediterranean Sea to the Sudan is no light task and requires quite a lot of organising. Travel by caravan has greatly declined in recent years, partly owing to the practical extinction of the slave trade, which formed the most valuable trade of days gone by, and partly owing to the improved means of railway communication between the Sudan and the west coast of Africa and between the north-west coast and the desert south

of the Atlas Mountains. Much of the trade which formerly crossed the desert by caravan is now carried both more quickly and more economically by railway train and by steamship. Indeed, transport by camel, as by all animal agencies, is costly. The average camel carries from three to four hundredweights, from which it will be seen that a relatively small steamer can easily carry as much as 10,000 camels, and will also effect a quicker delivery.

It has been estimated that the total population of the Sahara is rather under 2,000,000, of whom nearly a fourth are found in the Algerian Sahara. The majority of these 2,000,000 are nomads, but, as we have already shown, the nomads are more dependent on the oasis settlements than might be thought. Fixed centres are essential for their existence ; to these they have to resort for their markets and their news and everything which connects them with the outside world.

What is the future of the Sahara ? What can it contribute to the world's wealth ? It produces a great and ever-increasing supply of dates. Rice, wheat, and barley ; peaches, oranges, grapes, figs, and pomegranates are grown in the oases. Gum acacias and ostriches are found on the southern Saharan borderland where desert merges into grassland. The nomad lands might produce more camels, asses, goats, and sheep, whilst salt, phosphates, potash, and soda are the chief mineral products.

"When all has been done for the economic development of the Sahara which is possible, when France, Great Britain, and Italy between them

maintain peace throughout its wide extent, when a population ten times as numerous as it now is finds in it means of support, the desert will in outward aspect be little altered. It will remain a land of immense solitudes and boundless horizons, of strange dead mountains and dry river-beds, of verdant oases, waving palms, and ever-receding

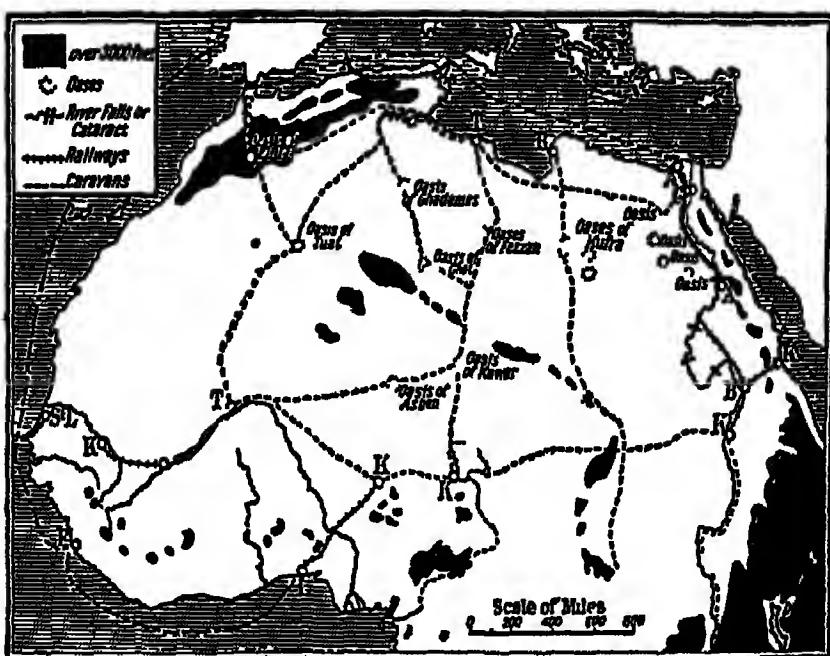


Fig. 44.—THE CHIEF SAHARAN CARAVAN ROUTES

mirages—a land of heat and thirst, of rock and dune, in which the tents of the nomads and the caravans of camels will leave a more lasting impression than the lines of steel which bind it anew to the outer world.”¹

But we must not forget two Old World lands which largely owed their early importance to the presence of protecting deserts. To these lands rivers brought the life-giving water from places

¹ Mr. Frank R. Cana in the *Geographical Journal*

beyond the desert. From the Central Plateau of Africa, with its heavy rain through the year, the Nile flows northwards to the Mediterranean. In the summer-time rain falls on the plateaus of Abyssinia and also flows into the Nile. This extra supply of water from Abyssinia more than fills the Nile, so that it floods its banks, and washes over the land for miles on either side. Ordinarily we look upon floods as great disasters, but the Nile floods change the desert into fertile land. Long ago men built their villages near by on some ground above the flood level, and sowed their grain in the fresh mud which the river left behind.

Towards the sea the river deposits still more mud, and through the ages has built a great delta. In the thin ribbon of flooded fertile land and in the delta, the Egyptians, for thousands of years, have cultivated the land for food. Jacob sent his sons to Egypt for corn ; the Romans called it the "Granary of the South," and corn is grown there to-day.

At the present time, however, the Egyptians, with the help of the British, have learned how to make the Nile do more for them than in early times. Instead of the water being allowed to run away as soon as it can, barrages or dams have been built across the river to check its flow and to help in storing the water. The result is that the Egyptians can grow other crops besides their food. They can grow rice and corn for export, and above all fine cotton, which is sold to Britain and other countries to be made into cloth. Alexandria is the great port of Egypt, and Cairo, the largest city in Africa, the capital. Egypt, then, is the "Gift

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of the Nile," and it is no wonder that formerly the Egyptians worshipped the river. Egypt is the most important of all the Saharan oases.

Farther east is the other great early home of civilised man. The Tigris and Euphrates flow from the northern highlands and receive their water from the rain and snow which fall there. In spring the rapid thaws send more water to the rivers than they can carry, with the result that

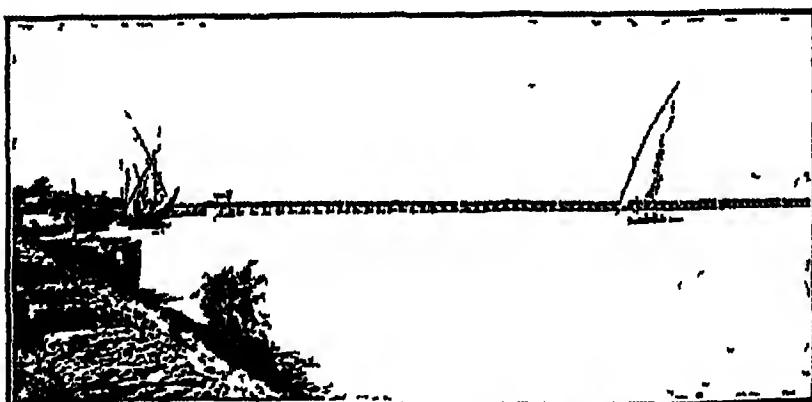


Photo by Underwood Press Service

FIG. 45.—PHOTOGRAPH OF THE FAMOUS ASWAN DAM.

During the flood season the sluice gates are opened, but during the dry season a great mass of water is held up behind the dam and utilised for watering the surrounding land.

they overflow their banks and thus make it possible for the people living between Bagdad and ancient Babylon to the north, and the swamps at the head of the Persian Gulf to the south, to cultivate the soil and build cities. Because the two rivers flow across a level plain, the men of the region made canals from one to the other to carry the water to their fields.

Wars and invasion led to the destruction of these canals, and the land went out of cultivation and became almost desert. A few years ago the

British began to reconstruct some of them and to build dams across the rivers. Just as Egypt has become prosperous once again, so we may hope that Mesopotamia, now called Irak, will become prosperous too. Besides growing dates, now largely exported from the magnificent groves near Basra, it may produce other crops such as rice, wheat, and cotton.

The Sinai, Arabian, and North-West Indian (Thar) Deserts are eastern extensions of the Sahara (see Fig. 93 for the character of the land bordering the Suez canal). Arabia is a plateau block so tilted that it presents a steep face to the Red Sea and a long gradual slope to the Persian Gulf. The higher districts in the centre and south-west receive slight rains, and on that account pastoral occupations can be carried on there, but elsewhere the land is practically rainless. As in the Sahara, there are oases, as, for example, in the valleys of the Nejd Plateau in the centre, where some rain falls in the spring and autumn and gives a temporary covering of grass. It is because of this that the Nejd district is famous for its horses, camels, donkeys, and sheep. In Yemen, in the south-west, where the land is higher and there are permanent streams, fields of wheat and fruit trees are common, and coffee is an important export from Mocha and Hodeida. It is grown on the slopes facing the sea.

The most interesting place in Arabia is Mecca, the birthplace of Muhammad, which is visited every year by thousands of pilgrims from all parts of the Muhammadan world. Medina, north of Mecca, is also a sacred city and contains the tomb

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of the prophet. Medina is in railway communication with Damascus and Aleppo. Aden, more than a hundred miles from the entrance to the Red Sea, is a British fortress and coaling station on the Suez route to the East. It is built in the crater of an extinct volcano and presents a very barren appearance. Rain falls very infrequently, so that huge storage tanks have been cut in the rock, while additional supplies are obtained by the evaporation of sea-water.

North-east of Arabia lies the Iran plateau, containing Persia, Afghanistan, and Baluchistan. Large areas of this plateau are desert wastes of a cooler type than those shown in Fig. 41, but the human conditions of nomadic and oasis life are somewhat similar. North and north-east of Tibet are the plateaus of the Tarim basin and of Mongolia, which contain interior temperate deserts of extreme climate. There, too, many of the general features of the hot deserts are found. Caravan routes from China pass through the Gobi desert, and there are several important caravan centres, while nomadic pastoral peoples inhabit the poor pastures of the better-watered parts.

Now turn to the hot desert of North America, which lies partly in the United States and partly in Mexico. Somewhat the same kind of climatic conditions as those found in the Sahara operate in this high plateau desert. Here, too, we find the nomadic herdsman and, where water is obtainable, the primitive agriculturist, but we also find white miners who live in places to which water is sometimes brought considerable distances by pipe-lines.

The most outstanding physical feature of this

desert region is the world-renowned canyon of the Colorado River. This river rises in the



Photo by Underwood Press Service

FIG. 46.—THE COLORADO CANYON

Study this photograph very carefully whilst reading its description on pages 118 and 119

Rockies, where it is supplied by snows and rains which maintain its current all the year round.

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For two thousand miles the Colorado flows across an arid plateau in parts over 8,000 ft. above sea-level. In one section over two hundred miles in length the main river flows at the bottom of a chasm nearly 6,000 ft. in depth and varying in breadth from ten to twelve miles, and it receives tributaries with comparable canyons. In these chasms is revealed the interior of the workshop of Nature and the secrets of the building-up of the earth's crust. One of the most wonderful sights in this maze of canyons, fantastically carved rocks, and huge castle-like rock masses, is the colouring of the various horizontal layers of rock. The greys of the limestones, the pinks, reds, and browns of the sandstones, and the sombre black of the older layers through which the river is now cutting, go to make a most awe-inspiring scene.

The flat-topped plateau remnants, called *mesas*, make excellent sites for the Pueblo Indians to build their dwellings of stone and mud upon.

Along the coasts of Peru and northern Chile we find the Peruvian and Atacama deserts. The latter is famous all the world over for its nitrates. The only areas where vegetation is found are the narrow ribbon-like oasis bands following the rivers crossing the desert on their way from the Andes to the ocean. In these fertile belts, which are "little Egypts," cotton, sugar, and tropical fruits are grown. The nitrates of northern Chile have been preserved owing to the rainless character of the climate. They are much sought after, not only for supplying poor and exhausted soils with the necessary constituents for increasing or renewing their productive capacity, but also for the manufacture of chemicals and

explosives. Iquique and Antofagasta are the chief nitrate ports. Both are practically rainless.

Now we come to the Kalahari Desert, in South-West Africa, where true desert conditions are confined to a coastal zone from thirty to eighty miles in width, the interior being a scrubland of thorn-bushes and poor pastures which improve as we go eastwards. It was the mineral wealth of this region which first led to its development by Europeans, for it is rich in diamonds and copper, the former being found along the coastal margins south of Walfish Bay, the latter in the northern districts, where some cattle-rearing is also engaged in. Both of these areas are reached by railway from Windhoek, which is in rail communication with Walfish Bay, the best harbour on a very barren and desolate coast.

The greater part of the Kalahari forms part of South-West Africa, now administered by the Union of South Africa under a mandate from the League of Nations. Before the Great War it was a German possession—except Walfish Bay, which was British. Windhoek is the capital.

Lastly we come to the desert of West Australia, which bears many resemblances to the Kalahari. The areas of nearly arid desert are not very extensive, for no part is quite without rainfall, although the actual amount is everywhere very small, most uncertain in its occurrence, and sometimes dry periods last several years. Bushes of thorns, scrub, and spiny grasses form the chief vegetation. The best known of the latter is the spinifex, a tall grass growing in clumps with leaves not unlike a bayonet. So sharp are the leaves that, if one

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is not very careful, they will cause dangerous wounds.

Travellers who know these dry Australian lands say that it is really wonderful how their appearance can be changed by one shower of rain. The dreary, barren, brown desert quickly becomes



Photo by Agent General for Western Australia

FIG. 47.—GENERAL VIEW OF A WEST AUSTRALIAN GOLD MINE

carpeted with many-coloured flowers and a thin covering of grass, only to be soon burned brown again by the relentless heat of the sun.

The Australian desert is of considerable importance owing to its rich gold-mines. The most important are in the district of Kalgoorlie and Coolgardie. The former is the chief centre and contains the famous "Golden Mile" of mines. Life in these desert mining towns has been made possible by the bringing of water by means of pipe-

lines all the way from reservoirs situated on the Darling Range. The pipe-lines follow the railway which now connects the mining district not only with Perth, but with Adelaide and other cities of the east. Farther north are the mines of the Murchison district, reached by rail from Geraldton.

We have seen that the chief settlements in desert lands are confined to the valleys of rivers which cross them, to oases, and to districts where there is some product of commercial importance. Men will live even in deserts, and endure hardship, if there are riches to be obtained. On all the desert margins, except in Australia, we find native nomadic tribes engaging in pastoral occupations. The "blackfellow" of Australia is extremely backward, and gets his living chiefly by hunting and gathering wild fruits. It seems likely that large areas of all the deserts we have discussed in this chapter will remain uninhabited and avoided by man and beast. It may be that in the future the climate of some parts may change, some for worse, some for the better. Changes of climate do occur even within comparatively short periods. Some scientists have suggested that, when coal and oil are exhausted, ways may be found of storing energy from the sun's rays. This would make the Sahara one of the greatest power centres of the future. So many wonderful things have been discovered by scientists and others that even such an astounding statement as this causes no real surprise to the modern world, despite the tremendous difficulties in the way of its accomplishment.

At present, however, these deserts are, in the main, regions of lasting difficulty and privation.

EXERCISES

1. What do you notice to be common in the location of all the world's great hot deserts? Why is this?
2. Write an account of a caravan journey from Tripoli to Kano
3. Try to collect pictures of scenes in desert lands and in desert oases. Describe in writing each of these scenes.
4. How was the Colorado canyon made?
5. If Iquique and Antofagasta are practically rainless (see page 121), how is water obtained for the needs of the people? Find out.
6. What are nitrates? How were they formed? How are they obtained, and for what purposes are they used?
7. What do you know about the lives of the Hottentots and Bushmen of South Africa and the Blackfellows of Australia? How have they been affected by the coming of white men to their countries?
8. Describe the various kinds of vegetation found in arid lands and show how they are adapted to their environment.
9. Do you know why such splendid monuments as the temples and pyramids of Egypt are in such a fine state of preservation? Find out why the dwellings of the common people have disappeared.

CHAPTER IX .

EQUATORIAL FORESTS AND TROPICAL GRASSLANDS

ALONG the Equator, and stretching for about 10° north and south of it, we find the great Equatorial forests of the world. Fig. 48 shows the vast forests of the Amazon, known as *Selvas*, in South America ; those of the Congo Basin and Upper Guinea coastlands of Africa ; and those of the East Indies, in the great archipelago lying between Asia and Australia. All these lands have a high temperature every day throughout the year, and they have rain at all seasons, if the word "season" can be used correctly of such lands of high equable temperature and all-the-year-round raininess.

It is because of these hot-house conditions that vegetation grows most profusely, and we find vast forests of giant timber trees festooned with lianas and vines, to the floor of which, deep in damp mould, rotting leaves, and decayed and fallen trees, the sun scarcely reaches. Not every part of the areas marked on Fig. 48 is so covered, but such is a brief description of the greater part. North and south of these forests are expanses of tropical grasslands, quite different from the temperate grasslands we read of in a previous chapter. Generally the change from forest to grassland is

not abrupt, and there is a transition zone partaking of the characteristics of both ; but very often one type does give way suddenly to the other, especially in areas where natives have long been making attacks on the forest.

One traveller, Dr. C Christy, tells how, in the northern Congo, he stepped one morning abruptly from forest into the sunlight and waving grass. " The sudden change from the dank, dark, humid surroundings which prevail in the forest is apt to result in prolonged headache and discomfort, and I was no exception to the rule until I became accustomed to the distant view, the sun, and the breeze."

Why does forest give way to grassland in this way ? The answer must be found in climatic changes. In Chapter I we learned that, because the earth's axis is so tilted that the North Pole is inclined towards the sun in summer and away from it in winter (see Fig 4), the sun is not always overhead at noon at the Equator. It appears to migrate northwards in our summer and southwards in our winter, reaching the Tropic of Cancer, its most northern limit, on June 21, and the Tropic of Capricorn, its most southern limit, on December 21st, and appearing overhead at noon at the Equator on March 21st and September 23rd. This migration causes the area of greatest temperature to be north of the Equator in our summer and south in our winter. Now this area of greatest temperature is a region where rain falls because it is a region where in-blowing winds meet, and is therefore a region of rising air. The result of all this is that near the Equator rain falls all the year

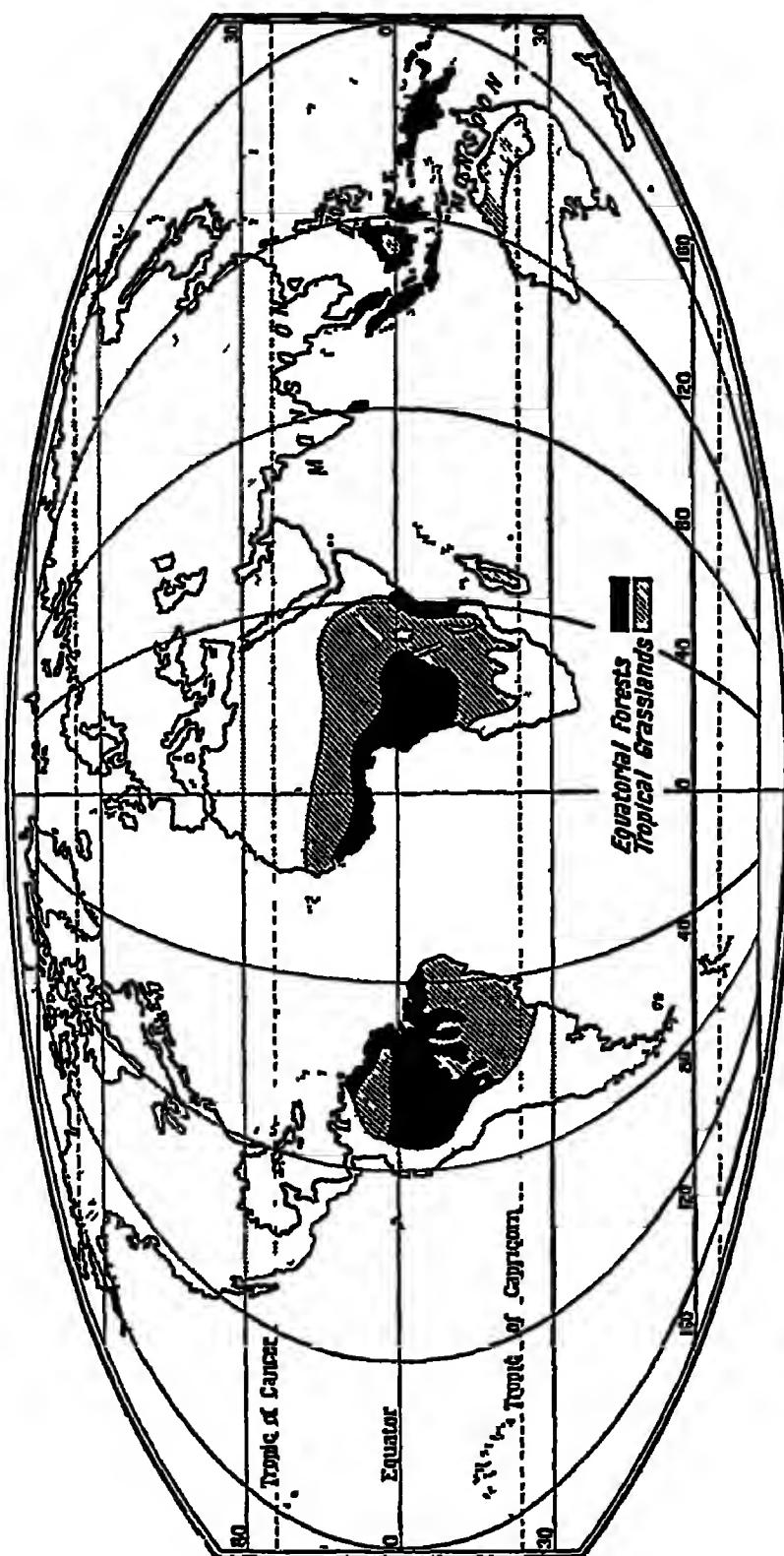


FIG. 48—THE DISTRIBUTION OF THE CHIEF EQUATORIAL FORESTS AND TROPICAL GRASSLANDS.

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round, whilst north and south of that region are areas where rain falls mainly in summer at the time when the vertical sun is north or south of the Equator. In general the rainfall is not sufficient for forest growth, so that the natural vegetation of the zones north and south of the equatorial forest is grassland.

Let us now turn to the equatorial forests of the Amazon. Here equatorial forests cover a vast, almost level tract of country over 1,500 miles from east to west and 1,200 miles from north to south. Iquitos, a small rubber centre, stands on the Amazon near the eastern base of the Andes and some 1,700 miles from the ocean. It is built on land about 300 ft. above sea-level. That means the average fall from Iquitos to the sea is only about 2 in. per mile. This gives an idea of the flatness of this great basin, which is really a filled-up sea. Lord Bryce says of its vegetation : "All the country is covered with forest. The trees grow so close that there is no way of travelling except by boat along the streams. Intense heat and abundant moisture combine to make the vegetation so profuse and rank, that ground cleared of trees is, after three or four years, covered thick again."

Large areas are not developed, indeed considerable tracts have not even been explored. In those parts of the forest bordering the Atlantic, and to a smaller degree in certain areas along the river, plantations have been established, but the greater part of the basin is unhealthy and inaccessible. White men cannot settle there, whilst some of the natives are among the most backward and degraded peoples of the earth. The Amazon basin is one

of the least populated and least developed areas in the world, for its excess of water makes it as unsuitable for man as the waterless tracts of the Sahara, and its constant heat as difficult as the cold of the Arctic regions. At present it is a land of only one great product of commercial impor-



FIG. 49.—PHOTOGRAPH OF A SCENE IN THE EQUATORIAL FORESTS OF WEST AFRICA

tance, and in the production of that commodity, rubber, it is the chief region in the world.

Large numbers of natives are employed in obtaining the crude rubber from the trees, and their lives are not very pleasant. The forests abound with reptiles, including great tree snakes, monkeys, and birds of many varieties, especially brilliantly coloured parrots, whilst alligators and turtles abound in the rivers. Some of the natives are

extremely backward. Writing of one tribe living in the valley of the Rio Negro, one of the largest tributaries of the Amazon, Dr. A Hamilton Rice says : " These [the Makú Indians] have no fixed abodes or plantations, nor do they use the chattels of the ordinary Indian, such as hammocks, dug-outs, canoes, and axes, but roam ceaselessly through the forest, living by hunting and fishing, or on the uncultivated fruit of the country. They are among the most miserable of all the aborigines of the Brazilian Amazons, being hunted down by the stronger communal tribes, who impress them for field and house work, or dispose of them to unscrupulous traders. In March of this year [1918], when stopping overnight at the mouth of the Marié, the kind and obliging old trader whose house is situated at that place had rounded up for our inspection the following morning some Makú of the neighbouring forest. They were a wretched-looking lot of dirty, unkempt, naked savages. When taken into servitude they are, as a rule, kindly treated, and with sufficient nourishing food and protective clothing, fare better than in their freedom and nakedness." This extract shows that slavery is not yet dead in the world.

As the region becomes better known and white men learn how to overcome its difficulties, there are vast numbers of valuable timber trees which will find their way to the ports for exportation. When clearings have been made, almost every kind of tropical product will be produced on a large scale. The Amazon is a magnificent water-way navigable as far as Iquitos, and for ocean-going ships as far as Manaos, the chief rubber-

collecting town in the interior, standing at the confluence of the Amazon and the Rio Negro. Para, which gives its name to Amazon rubber, is the chief port at the mouth of the river.

The tropical grasslands, or savannahs, of South America are found in the region of the Guiana Highlands, north of the selvas, and in the Brazilian Highlands to the south. Both regions are plateaus, and at present do not support nearly so many people as the tropical grasslands of Africa. Cattle-rearing, the natural occupation of such lands, is increasing in importance as better means of communication are provided. In the Guiana region most people live on the coastal plains, where the conditions somewhat resemble those of the Amazon basin. Sugar and cacao are extensively produced in plantations situated in forest clearings. White men cannot do the hard work in these plantations, so that labourers have been introduced from Africa and India in such numbers that negroes and coolies far outnumber the whites. Georgetown, the capital of British Guiana, is the largest town in the region. It is near the mouth of the Essequibo, the chief river.

The coastal margins are also the most important parts of the Brazilian Highlands. The south-east trade winds bring an abundance of rain, and the warm, moist climate is free from frosts. Cotton, tobacco, sugar, and coffee are all produced. Three-quarters of the world's coffee comes from Brazil, and of that total two-thirds is grown in São Paulo and exported largely from Santos. There is no other instance of a great country depending so entirely on a single crop, grown within an area

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so small when compared with its total bulk. Rio de Janeiro, from which railways climb the difficult slopes of the escarpment and reach the cattle-rearing, plantation, and mining districts, is the largest port and city in Brazil. Mining has just been mentioned. In Brazil this is chiefly for precious stones, especially diamonds, found in the upper valley of the São Francisco.

The African counterpart of the selvas of the Amazon is found in the basin of the Congo and along the Guinea coast (see Figs. 48 and 49). In these areas tall, stately trees rear their heads into the sunlight, and creepers as thick as a man's body twine themselves about the trunks, making it almost impossible for man or beast to penetrate. The damp undergrowth harbours insects and reptiles which are more deadly than large animals. It is believed that these forests were once more extensive than they are to-day, and that they extended farther north and south as well as farther east than they do now. Captain Stigand, in an article in the *Geographical Journal* entitled "The Lost Forests of Africa," says "Wherever the white man, in his first exploration of Africa, has met with agricultural tribes living in juxtaposition to forest areas, he has found these tribes busily destroying the great timber trees with fire and axe, and extending their cultivation at the expense of the forest area. The native has learnt that the fertile soil, freshly cleared of forest, yields him a most productive harvest for his crops. As he is, as a rule, quite innocent of the arts of scientific agriculture and manuring, this freshly cleared land

begins to get poor after a few years of cultivation. He then proceeds to clear more forest, rather than make use of fallow land already cleared. As long as there is any forest to attack he continues to devastate it either until it is finished or, in recent



FIG. 50.—THIS PICTURE SHOWS THE TAPPING OF RUBBER TREES IN A PLANTATION IN THE FEDERATED MALAY STATES

Describe what is taking place

years, until the white man steps in to protect what remains ”

Into the densest parts of the forest few people have gone either to live or to explore. A small race known as the pygmies seem to have escaped from the stronger negroes and to have made in the forest a clearing and a home Little is known about them, for few have seen them The men hunt with bows and arrows ; the women gather wild fruits and berries. The houses are really

shelters made of timber and roofed with branches and coarse grass, while a rough stockade round the group of huts helps to keep wild animals away. Sometimes the women sow maize or plant bananas, otherwise they know little of cultivation.

Dr. Christy, already mentioned in this chapter, in 1913 passed through the pygmy country of the upper reaches of the Aruwimi, one of the northern tributaries of the Congo, and camped with the Bambutte pygmies. Here are a few extracts telling what he saw: "In a partial clearing in the darkest part of the forest were a cluster of twelve or fifteen tiny huts. At first the little people were inclined to strike camp and move on, but with care and patience on my part we became good friends, and many a long day's hunt, often for nothing, I had with them. They were always wanting salt, and in order to get it they would sometimes treat me to a ball in my quarters as it were, for the pygmies are fond of dancing, and weird tamashas their performances are." "After an hour or so of this the little people would file past my tent, and each receive a spoonful of salt from one of my bags, while I distributed arrows, beads, knives, or something useful, to each of the elders. In the forest the pygmies, when not tracking animals, seem always hunting for honey. I have watched them put their arms into bees'-nests in holes in trees and carefully fetch out piece after piece of honey-comb, while a cloud of bees buzzed round them, but for some reason or other not angry bees, and not once would the robbers get stung."

"The household arrangements of the Bambutte

are most primitive. He seems to have almost no idea of cooking. Meat of any sort, large animal or small, he eats either raw or toasted. In the forest he grubs up roots, climbs high for all sorts of fruit and berries, prizing the kola-nut as much as anything, hunts for mushrooms, will track a tortoise and haul it from beneath a stump, or stalk a monkey and transfix it with a little needle-pointed, hardwood, poisoned arrow at almost any height. Monkey is perhaps his favourite food."

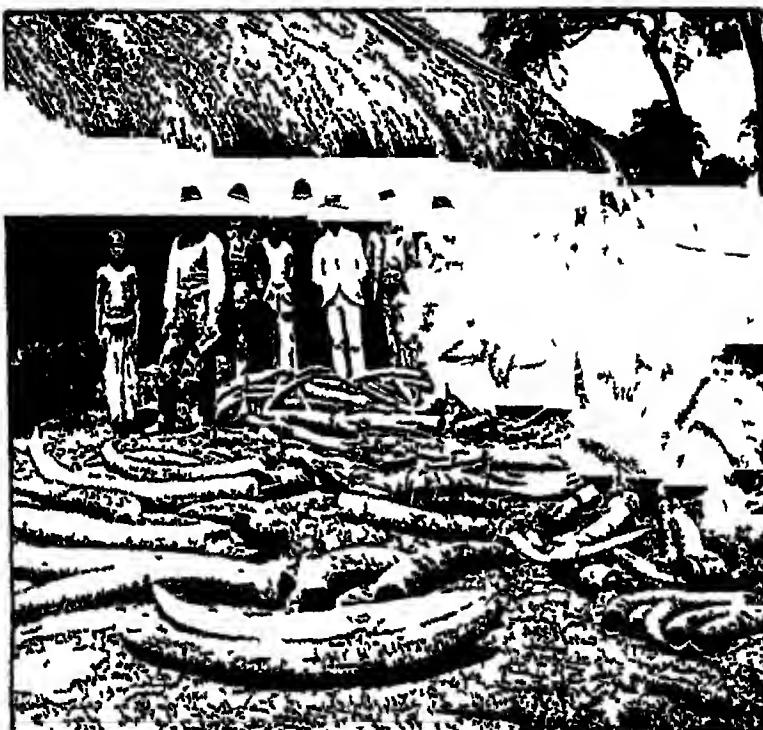
Pygmies are, however, a minority of the dwellers in the equatorial forests of Africa. The rivers make long, wide avenues between the trees and also provide means for getting from place to place by boat. Many villages of ordinary-sized negroes are therefore made along the banks of streams. Most of the coast, too, is inhabited, for the wind and surf have thrown up long lines of sand-dunes on which coconut palms grow and villages are built, while behind the dune a vast lake or lagoon takes the place of the forest.

Five hundred years ago the Portuguese came along this coast, and the negroes near the shore saw great boats with white sails appear over the horizon and come nearer and nearer. After the Portuguese came British, Dutch, and Danes, for the Europeans learned that they could do good trade there in gold and ivory. Soon they found that "black-ivory"—the negroes themselves—was the most profitable commodity. Hundreds and thousands of negroes were captured and shipped as slaves to America to work for Europeans there on the plantations of sugar, tobacco, and cotton. Against his will the negro was given a new home

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in the New World that Columbus had found. To-day millions of negroes live in America, and though they are no longer slaves, as their forefathers were, they cannot return to Africa, for they are far too numerous.

When the negro himself was no longer profitable



By permission of Hodder & Stoughton, Ltd.

FIG. 51.—THIS PICTURE SHOWS AN EAST AFRICAN STORE
The ivory tusks from the elephant are largely used in making pianoforte keys and billiard balls

to capture and sell into slavery, Europeans wanted his home, for they learned how valuable tropical forests could be. Cocoa and rubber could be grown, the trees yielded good timber, the palm-nuts yielded oil, and there were elephants to hunt for their ivory. To-day great changes are taking place in the equatorial regions of Africa. The

negro no longer goes about almost naked, but dresses in cotton goods made in Lancashire. His house is often of sun-baked bricks roofed with corrugated iron. He is learning to read and to write, and in many ways to become "civilised." Where once the forest grew, plantations of cocoa and rubber and ground-nuts (monkey-nuts) owned and cultivated by natives are springing up. British and French mining companies have mines to obtain gold and tin from the rivers and the rocks. Good harbours are being built, railways made, and motor roads constructed. All is changing, and under the guidance and with the help of Europeans the negroes are learning how they may become rich by their work. Most negroes still live as negroes have lived for centuries, but some, at least, are learning how to make the tropics prosperous.

Before leaving the equatorial forests of Africa, let us notice a few of the chief towns and ports. Along the Guinea Coast are Freetown, in Sierra Leone; Accra and Takoradi, in the Gold Coast Colony; and Lagos, the chief town and port of Nigeria, and the headquarters of the steamboats navigating the Niger. From these centres railways have been built into the interior. Leopoldville, on Stanley Pool, is the capital of Belgian Congo. Mombasa and Zanzibar are two of the ports on the narrow east coast and islands, where somewhat similar conditions are found (see Fig. 48).

Round the dense forest is a lighter forest reached as we move north or south from the Equator, or eastwards, as we ascend the East African Plateau of the Great Lakes. The forest passes into park-like country, and this, in turn, passes into the

tropical grasslands of the Sudan, East Africa, and Rhodesia. Beyond these are the deserts of the Sahara, Somaliland, and the Kalahari. These parklands and grasslands, like the equatorial forests, are the home of the negro, and it is here that the finest tribes are found. In the wetter parts, that is, nearer the forests, the land can be

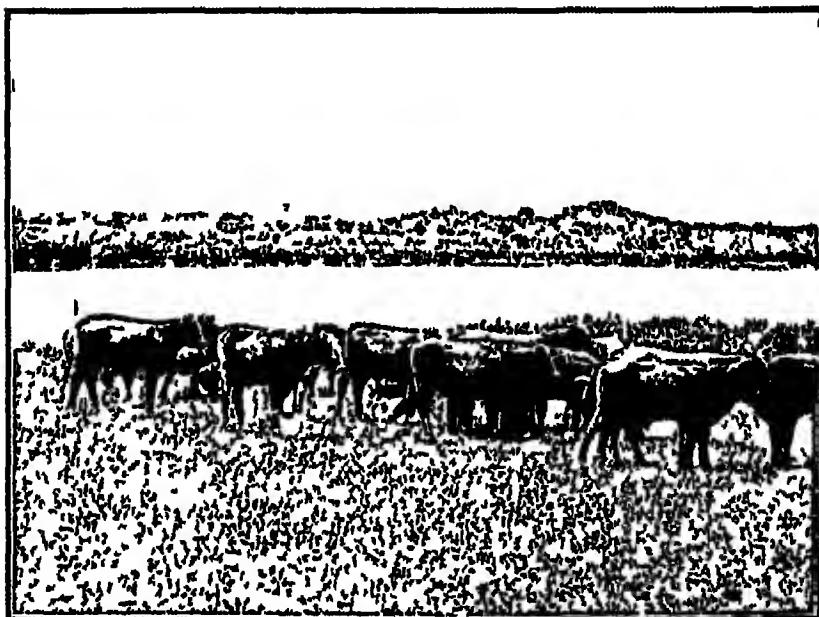


Photo by Rhodesian Government Office

FIG. 52.—THIS PHOTOGRAPH SHOWS A SCENE ON A RHODESIAN CATTLE RANCH

cultivated, and tribes engaged in agriculture, like the Hausas of northern Nigeria, are found. They grow millet, wheat, maize, beans, cotton, and indigo, and are also very clever craftsmen. In the drier parts towards the Sahara and on the eastern plateau cattle-rearing is the chief occupation, and it is here that we find the pastoral Fulas of the western Sudan and the Masai of the high plateau. On the lower parts of the eastern plateau are .

scrublands where antelope, zebras, lions, rhinoceroses, and other "big game" abound, whilst in the higher parts nearer the volcanic highlands of the Great Lakes the rainfall is sufficient and the soil rich enough for cotton, tea, coffee, and other crops to be grown in plantations supervised by Europeans.

The mention of cotton raises a most important problem. The Lancashire cotton trade is Britain's most important manufacturing industry. Lancashire relies very largely upon American cotton. Sooner or later America will be unable to supply the demands of the Lancashire manufacturers, and already attention is being directed to possible sources of supply within the Empire. It is to the wetter savannahs of such places as Anglo-Egyptian Sudan, Nigeria, Uganda, Kenya Colony, and Tanganyika Territory that Lancashire will chiefly turn. It should be remembered that in 1891 the value of the cocoa exported from the Gold Coast was £4; in 1927 it was £11,700,000. What can be done with cocoa, can at least be attempted with cotton.

Some of the towns of the African tropical grasslands are very important. Timbuktu, Kano, and Kuka are termini of Saharan caravan routes. Timbuktu is five miles from the Niger and is a trading centre for goods from the Mediterranean, the desert, the grasslands, and the forest. It can be reached by a rail and water route from St. Louis, at the mouth of the Senegal. Kano, a manufacturing centre of native cotton, pottery, metal and leather goods, is now in direct rail communication with Lagos. Kuka, near the western

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borders of Lake Chad, is a market town and centre of caravan routes from Tripoli and Kano.

The third great region of equatorial forest



Photo by Malay States Information Bureau

FIG. 53—THIS PHOTOGRAPH SHOWS A SCENE IN A MALAY COCONUT PLANTATION

occupies the lower lands of the islands of the East Indian Archipelago, Ceylon, and the Malay Peninsula. The dense forest vegetation resembles that of the Congo and the Amazon, and the influence of

this is seen in the primitive habits of many of the natives. On the whole, however, this region of



Photo by Malay States Information Bureau

FIG. 54—HERE WE SEE A MAN CLIMBING A TALL COCONUT PALM GROWING ALONG THE MALAYAN COAST

Describe the method of climbing

equatorial forest is more favoured than the others. The influence of sea winds everywhere tempers the heat, and there are no very extensive areas of

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unhealthy swamp-land. All the islands contain mountains, so that many kinds of products can be cultivated, and the mountain tribes are more virile than those of the lowlands. Moreover, the ease of access by sea has brought Arabs, Hindus, and Malays to the islands, and there has been a mixture of races which has resulted in an improvement upon the general level of the native races.

It is because of this that the American, British, and Dutch owners of these islands have been able to develop the plantation system with great success. In the Malay Peninsula rubber, sago, spices, gutta-percha, pepper, coconuts, and sugar are extensively cultivated (see Fig. 50) Tin is mined in the British Federated Malay States, which are the world's chief source of supply of that valuable metal. The Dutch have made Java the most productive and densely peopled island in the archipelago. Its plantations of rubber, coffee, sugar, cinchona, tobacco, rice, coconuts, and sago support over thirty millions of people. Sumatra and Borneo export rubber, pepper, coffee, and tobacco; Celebes and the Moluccas are noted for spices. The Moluccas are the famous Spice Islands which played such an important part in the discoveries of the fifteenth and sixteenth centuries. Ceylon has rice fields, and tea, rubber, and coconut plantations.

Colombo, on the west coast of Ceylon; Singapore, on an island off the southern extremity of the Malay Peninsula, and Batavia, on the northern coast of Java, are the most important ports and trading centres. They have all splendid sites on great commercial highways, especially Colombo and Singapore.

Along the northern coasts of Australia, where most rain falls in summer, there are forests of a lighter kind than those found in equatorial lands, but south of these lighter forests there are grass-

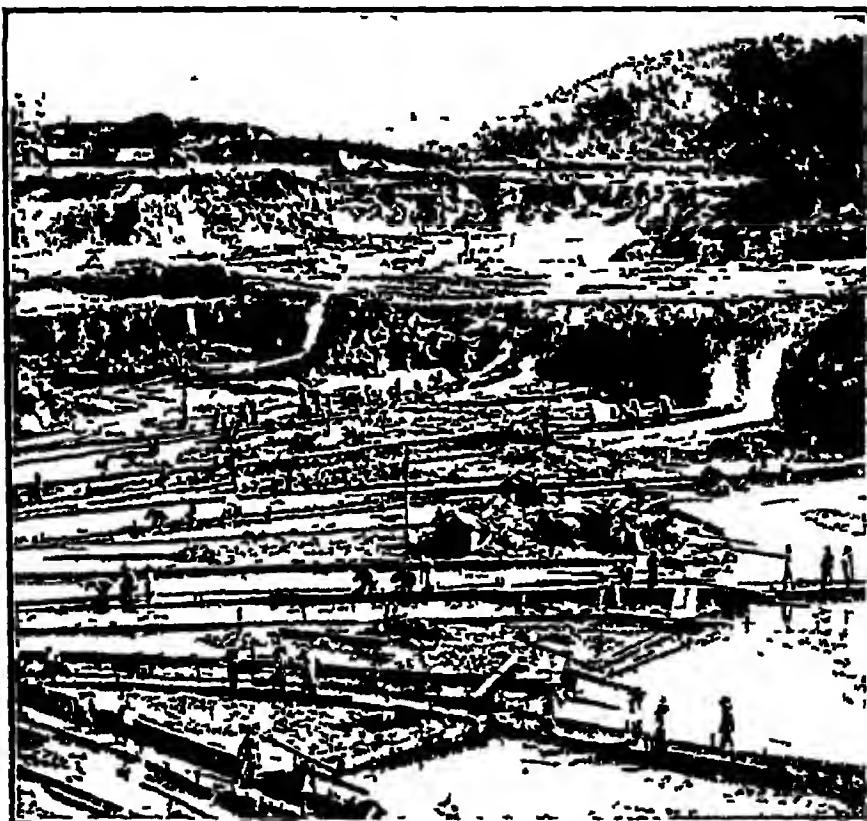


Photo by Federated Malay States Information Bureau

FIG. 55.—PHOTOGRAPH OF A HYDRAULIC MONITOR AT WORK ON THE ROCK CONTAINING TIN ORE IN PERAK, FEDERATED MALAY STATES

The powerful jets of water cause the soft rock to crumble, and the ore and the rock are swept by the backwash into the long troughs shown in the picture. Cardiff and Swansea obtain much of their tin from the mines of the Malay Peninsula.

lands of similar general type to those tropical grass-lands which we have already described (Fig. 48). Cattle rearing is the chief occupation. The cattle are reared for their beef and hides, not for milk and milk products, such as butter and cheese.

We said that the Arctic lowlands were regions

of hunger and privation; the northern forest lands regions of difficulty, and the drier steppes regions of wandering. How may we describe equatorial forests and their marginal tropical grasslands? Prof. Fleure, who suggested these picturesque and illuminating titles, describes equatorial forests, where man engages in collecting, hunting, a little gardening, and some fishing, as "regions of debilitation" whose people are among the humblest types of mankind and represent stocks that are dying out and have been forced into the forests by the competition of better-equipped peoples. The plantations of the East Indies, and of some parts of the African and South American regions, are on a far higher level. So are the agricultural parts of the tropical grasslands, but the drier grasslands of the pastoral nomads, like the steppes, are lands of wandering and, like them, have often sent forth raiders to the agricultural communities of the wetter grasslands. Thus the Fulas raided and conquered the Hausas, amongst whom some of them settled, in the eighteenth century. The raiding activities of Masai and Matabili have only been checked in the nineteenth century by the appearance of Europeans.

EXERCISES

1. Describe the geographical conditions which have produced equatorial forests and tropical grasslands or savannahs.
2. Why is a journey up the Amazon from Para to Manaos not so pleasant as the return journey from Manaos to Para?
3. How is rubber obtained from trees? In what form

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does it come to this country? Mention some of the uses to which it is put.

4 How does the relief of the Congo basin differ from that of the Amazon?

5. Trace an outline map of Europe and on it draw to the same scale a map of the Amazon and its tributaries. What do you learn about their respective sizes?

6 Rubber, palm oil, ivory, and cocoa are the great products of tropical Africa. How are they obtained, and from what ports are they exported?

7. In what sense may the Congo forests be described as "Treasure Houses of the Past," or as "The Refuge of Lost Causes"?

8 Which part of Africa was known as the "White Man's Grave"? Why was this? Why is it not so dangerous to-day?

9. How would an explorer and his followers have to traverse the Congo basin? Describe their difficulties and dangers. Why could they not use animals?

CHAPTER X

MONSOON LANDS

WHEN you have been taking your summer holidays at the seaside, you must have noticed that in the early afternoon, when the air is warmest, a cool breeze usually blows from the sea. If you walk along the seashore in the evening when the sun has set, you have probably noticed that the delightfully cool sea-breeze is now replaced by a cold wind blowing from the land to the sea. Such daily land and sea breezes are quite common features of seaside towns. They are due to the fact that water takes in heat more slowly than land, and also releases the heat more slowly when the source of the heat is removed. Thus at the seaside during the daytime the air over the land is raised to a higher temperature than that over the sea, with the result that the warmer air expands more and bulk for bulk is lighter than the air over the sea. This causes the heavier and denser air from the sea to move landwards. When the sun has set the air above the cooling land becomes both cooler and denser than that over the sea. This causes a reversal of the wind, which now blows from land to sea.

Now the monsoon, or seasonal, winds of Asia are very much like these seaside land and sea

breezes. They are, of course, on a tremendously larger scale, and instead of occurring daily they occur yearly. In winter-time the land mass in the heart of Asia is very cold and so is the air above. This causes the particles of air to become compacter and the whole mass becomes dense and heavy. Over the Indian and Pacific Oceans warmer conditions prevail, and the air there is lighter and less dense than near the land. Air always blows from areas where the pressure is high, i.e. where the air is dense, to areas where the pressure is low, i.e. where the air is lighter and less dense. Thus, as is shown by Figs. 56 and 57, S.E. Asia has outflowing winds from land to sea in winter, and because of this the south and east coasts receive very little rainfall. In summer the air over the heated interior expands and becomes thinner and lighter. The denser, heavier air is over the sea at this season, so that air currents from sea to land are set in motion and these air currents naturally bring rains. In cases like this, where the general scheme of winds is interfered with by the unequal heating of land and sea masses, the seasonal winds are called monsoons. It is clear that, so far as rainfall is concerned, a monsoon climate is one of wet summers and dry winters.

All the countries of south-east Asia, south-east of a line drawn from the mouth of the Indus to Korea, are affected by monsoon conditions. They include India, Indo-China, China, Korea, Japan, and the Philippine Islands. India, Indo-China, Southern China, and the Philippines are much nearer the Equator than Northern China.

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Korea, and Japan, and are consequently much warmer. We have in Asia, therefore, both hot and temperate types of the monsoon climate. In the hot type the temperature of the warmest month is over 80° F., and the coldest month is seldom below about 60° F. In the temperate type

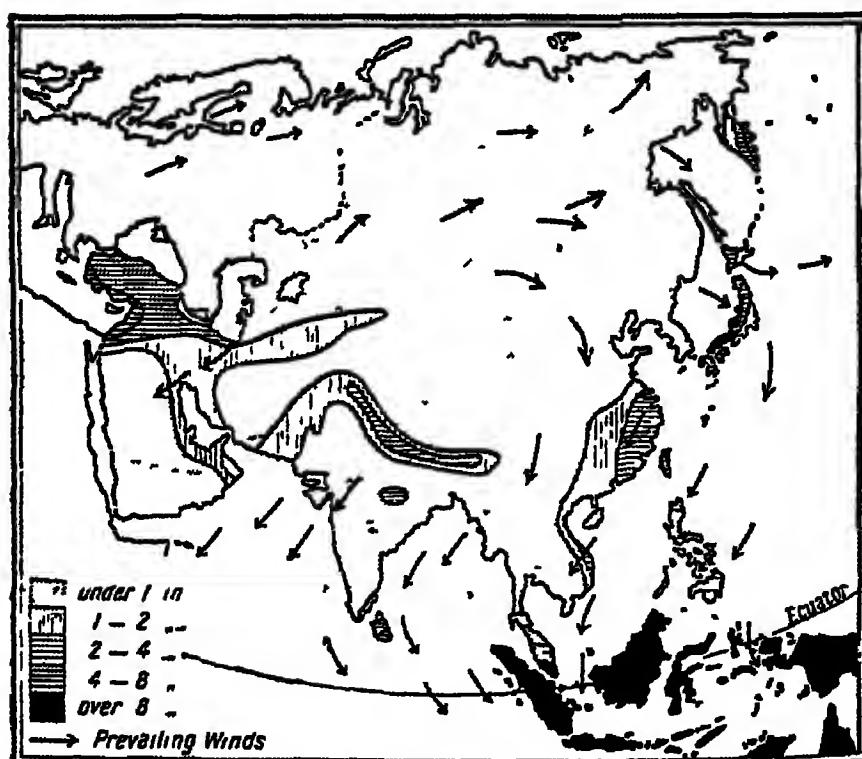


FIG. 56—MAP OF ASIA
Showing January winds and rainfall Compare with Fig. 57 opposite

the temperature of the warmest month exceeds 70° F., but the cold winds from the land reduce the winter temperature to between 20° and 40° F., according to latitude and position with regard to the sea.

These climatic conditions obviously influence the character of the natural vegetation and the cultivated plants. In the hotter south, where

the rainfall is also much heavier, the natural vegetation on the lowlands and the lower hill slopes is usually forest of a lighter kind than that found in equatorial lands, where there is no dry season and little variation in temperature throughout the year (see Figs. 56 and 57). The

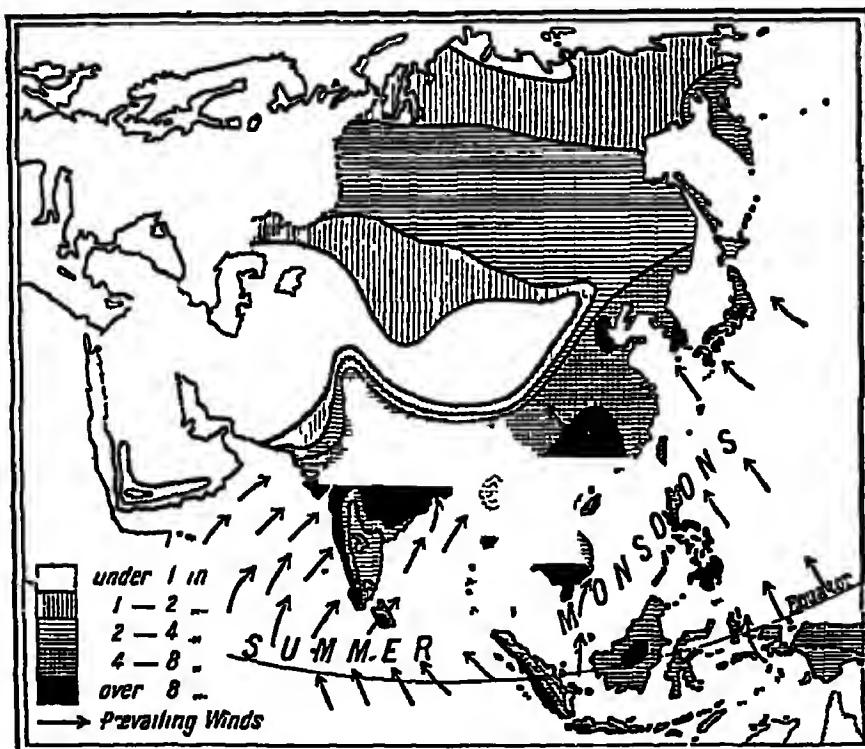


FIG 57—MAP OF ASIA.
Showing July winds and rainfall Compare with Fig 56 opposite

trees are not so close together, the forests are more open, and there is no such scramble of all plants for light. In the dry season most of the trees shed their leaves, and this gives somewhat of a wintry appearance to the landscape. The kind of trees varies very much. In India, Burma, and Indo-China teak is the most valuable timber tree; in Southern China the most valuable forest products

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are camphor and cinnamon, and in all parts there are many kinds of tree-ferns and bamboos.

The hot monsoon forest areas are not so rich in natural wealth as those of the Amazon and Congo basins, but they are healthier and more favourable for settlement by man. Where the trees have been cleared a wide range of cultivated products can be grown. Among these are rice, maize, millet, coffee, bananas, cotton, and indigo. It should be noted that in some of the drier areas there are tropical grasslands resembling those found north and south of the equatorial forests. Indeed, tropical grasslands and monsoon lands have very much in common and could well be grouped together. Both are lands of summer rains, but one is much drier than the other.

In the temperate monsoon lands of Northern China, Korea, and Japan, broad-leaved deciduous and evergreen trees are found at lower levels, and conifers on the mountain slopes. Their cultivated plants are also of a "cooler" type, and include, besides rice and tea, wheat, barley, beans, and maize.

Let us learn more of India, China, and Japan, the most important of the Asiatic monsoon lands. The great British dependency of India is shut off from the rest of Asia by a high mountain wall on the north-west, the north, and the north-east, namely, the Kirthar and Sulaiman Mountains, the Himalayas, and the Burmese ranges. The Bolan and Khyber Passes are the only important gaps in this mountain barrier, and they are both in the north-west. Conquerors and their accompanying hordes have entered India by these

gateways from Central Asia, but elsewhere the barrier has been crossed by very few invaders. The British reached India by sea. South of the northern mountains, upon whose highest peak, Everest, man has not yet been able to set his foot, there are the great plains of the Indus and the Ganges-Brahmaputra rivers which have headstreams in Tibet and find their way through the Himalayas by wild and rocky gorges. These plains are almost stoneless and are built of alluvium spread out by the river. Farther south the plateau of the Deccan presents a steep face to the Arabian Sea and a long gradual slope eastwards. Ceylon is a detached portion of the Deccan.

These three main divisions of India are inhabited by over 320 millions of people, yet there are only ten cities with more than 200,000 inhabitants. The majority of India's millions are farmers and tillers of the soil who live in villages. They belong to many races and speak many tongues. India is indeed a continent in itself. In the north-west where the Indus and its four chief tributaries drain a land known as the Punjab (= land of five rivers), large quantities of wheat are grown in winter. The seeds are planted just before the summer rains cease ; the crop is ripened during the sunny, dry season, harvested in February or March, and sent by train to Karachi for export to Britain and other countries.

Rice, the most important crop, because it forms the staple article of food for most of the people, is grown in the wetter parts of the Ganges basin, along the plains bordering the Deccan, and in the

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lowlands of Burma. India and China together produce about three-quarters of the world's supply of rice, but they need so much to feed their vast populations that comparatively little is exported.



Photo by Underwood Press Service

FIG. 58—THIS PHOTOGRAPH SHOWS THE DIFFICULTIES OF PLOUGHING A LOW-LYING RICE FIELD

It was taken in the Philippines, but it is typical of other "swamp" rice areas. There are two varieties of rice—"swamp" and "hill." Fig. 62 shows a scene in a "hill" rice area.

Most of the rice sent abroad is exported from Rangoon, the chief port of Burma. Tea, like rice, requires a heavy rainfall, but, unlike rice, the water must not stay around its roots. It is there-

fore grown on hill slopes and on well-drained plains. It is a hardy plant and can withstand winter frosts. Most of the tea we import from India is produced on the hills of Assam. Darjeeling, the Himalayan hill-station, is also an important tea-growing centre. Some is also grown on the slopes of the Western Ghats and the Nilgiri Hills.

Cotton is another very important crop. It is chiefly grown on parts of the north-west Deccan which are covered by a fertile black soil of volcanic origin, and is largely exported from Bombay, which is also a cotton manufacturing town of increasing importance. Jute is at present the most valuable export of India. Its cultivation is confined to the lower valleys of the Ganges and Brahmaputra. Nearly a quarter of a million people find employment in the jute factories of Calcutta. In the Sundarbans, the swampy jungle land of the Ganges-Brahmaputra delta, grass, trees, and climbing plants struggle for existence in a poisonous atmosphere, so that it is shunned by man and is the home of tigers, crocodiles, snakes, and elephants.

Besides wheat, rice, tea, cotton, and jute, the following products are of great importance: indigo, used in the manufacture of a blue dye; opium, made from poppy-seeds and useful for medicinal purposes, although misused in the evil habit of opium-smoking; millet, next to rice the principal grain for home consumption, and extensively grown in the drier Deccan and Punjab; flax, grown in hot countries for the manufacture of linseed oil; and teak, a most valuable hardwood. In the teak industry elephants have been very cleverly trained

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to move the heavy logs from place to place. It must not be thought that the summer monsoons bring enough rain to all parts of India for all these cultivated products to be grown without resort to methods of irrigation. Without its network of irrigation canals the Punjab would not be as productive as it is ; without its canals and thousands upon thousands of wells, for in parts the land is pitted with them, the upper Ganges basin would not be able to support the millions of people it does. The same is true of the drier parts of the Deccan, where water is stored in huge tanks and reservoirs. When the monsoons fail, and the canals contain little or no water and the wells are nearly dry, then there is famine in India and thousands die.

Since 1912 Delhi has been the capital of the Indian Empire. It replaced Calcutta, partly on account of its superior position and partly on account of its historical importance.

Is it not wonderful that this vast country is governed by a nation, the British, who are non-Indian in race and religion, who do not make the land a permanent home, and who form a mere handful of the population ! They have established law and justice ; they have brought a considerable amount of prosperity, and there can be no doubt whatever that their rule has been of enormous value to the Hindus themselves. Education is making rapid strides among the natives, many young men have received a European education, and many natives have been advanced to important administrative positions. Two-thirds of them profess Hinduism, a most complicated religion, whose chief

feature is the caste system, which is a great hindrance to real progress.

In the main there are four castes or groups, the Brahmins belonging to the highest, or priestly caste. All Brahmins are not priests, but may become so. All the leading professions are filled by Brahmins, who belong to their particular caste



Photo by London Missionary Society

FIG. 59.—HERE WE SEE PEOPLE ASSEMBLING TO TAKE PART IN A HINDU RELIGIOUS FESTIVAL

Notice the "setting" of monsoon vegetation

on account of birth alone. The other important castes are the warriors and the farmers. In addition to these, there are very many other castes. All are inferior to those just mentioned, and even these decrease in importance. Those poor unfortunates belonging to the lowest castes are regarded with great contempt by the others. The

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castes have many subdivisions, so that to-day they number between three and four thousand. Each caste is commonly associated with some occupation, and since a man must follow the occupation of his father, the system exercises a tremendous influence over the people, for, as a general rule, men of different castes have little or no intercourse with each other. At death, however, the soul takes a higher or lower caste, according to the life a person has lived.

Rather more than one-fifth of the people are Muhammadans, who are found in all parts of the country, but in greatest numbers in the Indus basin, west of the Thar Desert. They are the descendants of the Muhammadans who entered India by the great gateways of the north-west, between the sixth and the sixteenth centuries. The Muhammadan religion was founded in the sixth century by Muhammad, who was born in Mecca. It was called Islam by its founder, who wrote the sacred book, the Koran, in which he unified the Arab worship of several gods, and taught "There is one God, Allah, and Muhammad is His prophet."

In order of numbers the Buddhists come next, and they are found almost entirely in Burma. This religion was founded by a man of the warrior caste, who lived near the Ganges about six centuries before the birth of Christ. He was not satisfied with the state of Hinduism, and wished for a simpler religion. He taught that Nirvana, the final end of life, is to be reached by a life of self-denial and indifference to pleasure and pain. Such a belief has the effect of making its followers live quiet and peaceful lives, but is not helpful

to national advancement. It is strange that to-day his religion is not followed in the land of its birth, but has its greatest number of followers in China. These three religions, the Hindu, the Muhammadan, and the Buddhist, are followed by the great bulk of the people ; but there are many others, such as those followed by the Parsis and the Sikhs, whilst there are nearly four million Christians.

The future holds many interesting questions for settlement, and among them, not the least important is, " Will India, like Australia and Canada, remain within the British Empire as a great self-governing dominion, or will she seek out her own salvation as an independent state ? "

Like India, China is shut off from the rest of Asia by mountain barriers, although not so completely as in the case of India, for China is easy of entry by land from the plains of Manchuria in the north. Like India, she is best approached by sea and entered by means of her great river valleys. A glance at the map is sufficient to show three rivers of outstanding importance, the Hwang-ho or Yellow River in the north, the Yangtse-kiang or Blue River in the centre, and the Si-kiang or West River in the south. The first two basins, comprising Northern and Central China, lie in the temperate monsoon belt ; Southern China, the basin of the Si-kiang, is a hot monsoon land.

Northern China is largely covered with a deposit called *loess* (see Fig. 60) We have seen that in winter time dry winds blow outwards from the heart of Asia. These winds carry with them very fine dust from the arid plateau regions over which they have passed. This dust has accumulated on

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the margin of the plateau, and in the course of time has completely buried not only the plain, but the mountains and hills, with a mantle of loess often 1,000 ft. and more in thickness. Its great



disadvantage is that it is porous, and so easily cut through that rivers and roads often cross it by intricate passages, on each side of which are very steep, often quite vertical, walls. It has, however, the great advantage of being fertile, although in

this connection its porous nature is a drawback, and makes irrigation a necessity in most parts. In colour it is yellow, or brownish-yellow, hence the names of the Yellow River and the Yellow Sea.

The Hwang-ho, the great river of Northern China, is in some respects one of the most remarkable rivers in the world. In its lower course it does not permanently follow a particular channel, as, owing to the deposition of sediment along the bed the latter is constantly being raised, so that the river really runs on a self-created ridge that is increasing every year in height. This, of course, necessitates the construction of dykes or embankments in order to confine the river to its channel, and since the bed rises, so the height of the dykes must increase. There is thus the ever present danger that the river may burst the dykes and find a new course. This has happened several times in the past with terrible results, for when the last serious change took place in 1851, owing to the dykes near Kaifeng giving way, the river, which is here very wide and swift flowing, turned northwards and found a new mouth north of the Shantung peninsula. The bursting of the dykes caused widespread devastation, the toll of those who lost their lives being calculated in millions. It is no wonder that the Hwang-ho is called "China's Sorrow." As it flows fast, is not very deep, and is liable to floods, it is not of very great commercial value, and in its lower course there are no large towns on its banks. But the fertile yellow silt which it brings down, and by means of which it is busily engaged in extending the lowlands into the

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Gulf of Chihli, has been of great value for agriculture, the predominant Chinese occupation.

These North China plains support a dense population engaged in the growing of wheat, barley, millet, beans, and maize. Cultivation is carried on with the careful attention we give to our gardens,

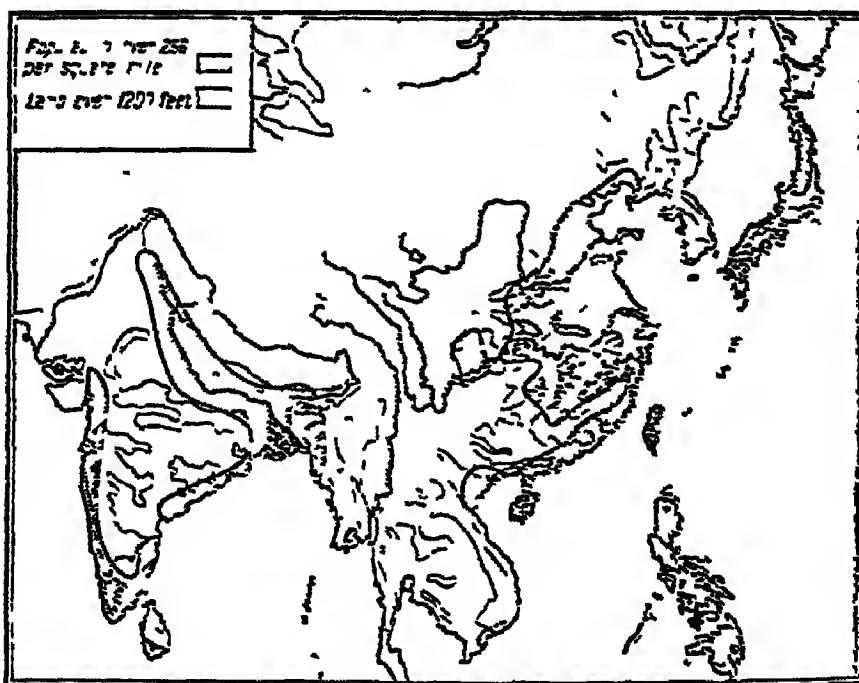


Fig. 6x.—RELIEF AND POPULATION OF S.E. ASIA.

and the chief implements used are the spade and the hoe.

The most famous city in North China, Peking, the capital of the empire until 1928, stands near to the northern gateway to the country. It was built there as a defence against invaders, as also was the Great Wall of China, which runs westward from the Gulf of Chihli for about 1,600 miles, climbing mountain-sides and descending into deep river valleys and even gorges. Tientsin is the port of Peking.

In the valley of the Yangtse-kiang, rice, tea, sugar, and cotton are important additions to the products of Northern China. The Red Basin of Szechwan, so called because of its red soil derived from the old red sandstone of which the area is largely composed, is situated in the upper basin of the Yangtse and is one of the most fertile and populated parts of China. It has also rich deposits of coal and iron as well as other mineral wealth. Hankow, the second largest city of China, is a centre for rice and tea, whilst at Hanyang, across the Han from Hankow, are great iron works of considerable importance to the future of China. In its lower course, the Yangtse flows through a densely peopled region in which cotton, silk, rice, and tea are of special importance. The outlet for this region—the richest in China—is the great port of Shanghai. Nanking, on the south bank of the Yangtse, became the capital of China in 1928. Long ago it was the capital. Its central position makes it a more convenient capital than either Peking or Canton.

Southern China has a dense population along the coast and in the lower basin of the Si-kiang, but the interior province of Yunnan is little known and backward, although it is stated to be very rich in all kinds of minerals, including coal and iron. Rice, tea, sugar, oil-seeds, and indigo are important products and remind us of India. The largest city in all China is Canton. As in many Chinese riverside cities, a large number of people—over three hundred thousand in Canton—live in boats which cover the river for miles. Near the mouth of the Canton River is Hongkong, an island which has been

British since 1841. It has a great trade in the products of Europe, India, China, Japan, and Australia, and is also an important naval station.

There are few English boys and girls who are not familiar with the physical appearance of the Chinese. The typical Chinese has a yellowish-brown skin, straight black hair, a rather broad, flat face with prominent cheek-bones, and narrow eyes. In the north the people are tall, but the southern Chinese are generally below the average in stature. Travellers who know China and its people intimately always speak of the Chinese unvarying cheerfulness, even under depressing conditions. As a general rule they are thrifty; splendid organisers, with very great capacity for adapting themselves to circumstances; exceedingly polite, and very trustworthy. They are particularly open to reason, and are capable of putting forth very considerable staying power, even on occasion enduring hunger, thirst, or exposure to a greater degree than most races.

Isolation from other countries has made the Chinese very conservative and often antagonistic to much-needed reforms, so that the foreigner, who has introduced new things into the country, is frequently regarded with hatred and distrust.

But there are signs that the Chinese are awakening. Large numbers of their young men now take courses of study in European and American universities, and as a result of this, Western knowledge is spreading; the mineral resources are being worked, and large quantities of machinery are being imported, while the extension of roads

and railways will undoubtedly help to give that sense of national unity which is so lacking in this large country. China in the past has been noted for her backward look, her pronounced conservatism; to-day she has the forward look, and modernism is the new passion of millions of her people. Where rush-lights were used twenty years ago, we now find the electric light, junks are giving way to steamships, straggling footpaths to railways and motor roads.

The island Empire of Japan, the Land of the Rising Sun, consists mainly of a long chain of islands off eastern Asia, stretching from Formosa, which is bisected by the Tropic of Cancer, to the Kurile Islands and the southern portion of Saghalien, which are in the latitude of southern England. It also includes the peninsula of Korea. Of all these the most important is the island of Honshu. We have already seen that Japan exhibits the characteristic of the temperate monsoon lands, but we must notice that the west receives rain in winter from the winds crossing the Sea of Japan.

Japan is a very mountainous land, and it forms part of a great portion of volcanic islands lying off the Asiatic coast and extending from the Kurile Islands to the Philippines. Evidence of volcanic activity is seen in the frequent earthquakes, of which the most terrible occurred in 1923, and the presence of hot springs and active volcanoes. The beautiful Fuji-Yama (12,500 ft.), the most famous of Japanese volcanoes, has not been active for about 200 years. There are very few lowlands, but the most important are the small lowlands

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near Tokyo and around the Inland Sea, and it is in these places that most of the people are found.

Owing to the heavy rainfall, the mountains of Japan are forest-clad. In the cooler northern islands coniferous and deciduous broad-leaved trees predominate, while the warmer southern islands produce bamboos, gigantic cedars, maples, mulberries, camphor and lacquer trees. Bamboos are put to innumerable uses. Lacquer, used in the decoration of many Japanese articles, is the gum exuded by a large shrub. Mulberries are used for the feeding of silkworms ("the Honourable Mr. Baby"), and Japan produces enough raw silk for her own use as well as a large surplus for export.

Rice is easily the chief cultivated crop, but there is not enough to meet the needs of the people. Some wheat, barley, and oats are grown in the cooler parts, and as winter-sown crops in the rice fields after the rice has been harvested. Tea is very important and is largely grown on the terraced slopes of the centre and south. Japanese methods resemble those of China, and most of the fields are cultivated intensively by laborious spade and hoe cultivation.

Pastoral lands are scarce in Japan. The effect is seen in the scarcity of cattle, horses, and sheep, and hence of such products as leather, dairy produce, and wool. The mineral wealth, however, is in some respects fairly considerable.

Characteristic minerals are sulphur, kaolin, and copper. Sulphur, of course, is obtained from the volcanic areas, and, together with the timber of the forests, has led to match-making. The presence of kaolin accounts for the fine porcelain



Photo by Underwood Press Service

FIG 62.—LOOKING ACROSS TERRACED RICE FIELDS TOWARDS ONE OF THE VOLCANIC MOUNTAINS OF JAPAN

How are the terraces kept up? The water supply is so controlled that it successively waters lower and lower terraces. How is this managed? There are similar terraced rice fields in China, India, and Ceylon.

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for which the Japanese are justly noted, while the artistic bronzework for which they are also famed is due to the considerable supplies of copper. Silver, lead, petroleum, as well as coal and iron, are also important mineral products, but the supplies of coal and iron, especially of iron, are not sufficient, either in quality or quantity, for the great industrial needs of modern Japan. That is why she looks to China for help in this direction.

The Japanese are great fishermen, and it is estimated that nearly one million Japanese have fishing as their sole occupation. Fish forms a very important part of the food of the people, not only because, from religious motives, meat is avoided, but also on account of the presence of rich fishing grounds within Japanese waters. This race of fishermen and seamen has become one of the world's greatest modern naval Powers.

Tokyo, the capital, has a population exceeding two millions. Its port is Yokohama. Osaka, the largest city, and Kobe are important ports on the Inland Sea, as well as cotton-manufacturing centres. The oldest inhabitants of Tokyo have seen a great change in their city during the last fifty years. Modern buildings, after the style of those of Western Europe ; electric lighting and electric trams ; motor-cars ; railway stations, from which lines run to many parts of Honshu ; Japanese in Western clothes, and the presence of a considerable number of foreigners, are all surprises for the man from the country when he pays a visit to Tokyo.

Since 1868, when the old military dictators were overthrown, and the power of the Mikado restored,

the country has made amazing progress. To-day she is one of the Great Powers of the world. She has learned one lesson from one nation, another from another, always selecting the nation in which that which it was desired to copy was best managed. The beginnings of the great step forward were guided by Europeans, but Japan is already able to take complete control, for her young men have been trained in the schools of the world.

The three great monsoon lands of Asia—India, China, and Japan—are countries of exceptional importance to-day, but in the future their importance in the affairs of the world will become still greater. One writer has said, "O, east is east and west is west, and never the two shall meet." East and West must meet, and indeed have already met. They must now understand each other and learn to respect each other. Almost three-quarters of the people in the world live in monsoon south-east Asia, and they are peoples with a future. The peace of the world largely depends upon a sympathetic understanding and appreciation of each other by East and West. The study of geography helps us towards this desirable end, for it teaches us to understand and appreciate other people, and not to judge people in far different lands from ours by our own conditions and experience.

We must now make a very rapid survey of the monsoon lands in other continents. Very similar in climatic conditions to the hot monsoon lands of Asia are the coast lands of northern and north-eastern Australia. Being south of the equator, the rainy season occurs during the dry season of

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India. The monsoon rain forests resemble those of south-east Asia, but the human geography is totally different. It is a new land, and even now very few white people live there. It can grow cotton, sugar, rice, and all the Asiatic products, and a beginning in this direction has already been made ; but it is largely an "empty" land, and will probably remain so for many years, for the



FIG. 63.—THIS SHOWS HOW QUEENSLAND SETTLERS WHO TAKE OVER FORESTED LANDS BURN THE VEGETATION TO MAKE WAY FOR THEIR FIRST CROPS

Australian Government, by its policy of a "White Australia," is attempting to keep as a white man's land a tropical land of the type in which it has still to be proved that white men can dispense with the services of Asiatic or other coloured peoples.

The south-east African region of Portuguese East Africa is another hot monsoon land of hot, wet lowlands and a drier plateau interior. White people own plantations of sugar, coconut palms,

rice, and sisal hemp, and natives provide the labour. The chief port, Mozambique, is built on a coral island. The lowlands of the French island of Madagascar are somewhat similar, but the interior plateau, where most of the people live, is a tropical grassland on which pastoral pursuits are followed.

Central America and the West Indies belong to the hot monsoon type of climate, although being exposed to sea influence the temperature conditions are more equable, and the seasons are chiefly distinguished by differences of rainfall, for the dry and the wet seasons are most marked. The mountainous character of the Central American isthmus and most of the islands helps to give a wide variety of products. Most of the region is forested by nature, and in areas where the trees have been cleared, man grows tobacco, especially in Cuba, sugar, especially in Jamaica, coffee, maize, and tropical fruits, e.g. pineapples and bananas. The Panama Canal is bringing increased prosperity to the whole of this region.

There are also some very important temperate monsoon lands which may be compared with Northern China and Japan. The most important is south-east United States, where most of the former forests of broad-leaved evergreens (oaks, beeches, walnut, and magnolias) have disappeared, and in their place we find great cotton, sugar, rice, and tobacco plantations. Cotton, chiefly shipped from New Orleans, on the delta of the Mississippi, is the dominating crop in the States stretching from Texas to North Carolina. This, indeed, is the chief raw cotton producing region in the world.

Rice is the chief crop on the low-lying, wet

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coastal margins which border the country from Texas to North Carolina. It is one of the chief foods of the ten millions of negroes who live in



FIG. 64.—A SCENE IN A COTTON FIELD

What kind of work is taking place? What is "cotton"? Notice the background of trees

the cotton-growing area. They are the descendants of African slaves who were brought over to do the labouring work on the cotton, sugar, rice, and

tobacco plantations, for the climate is too warm for the profitable employment of white men. Even until the conclusion of the American Civil War of 1861-5 the negroes were slaves, but they now enjoy freedom. The presence of so many negroes in the country presents a difficult problem for the Government of the United States.

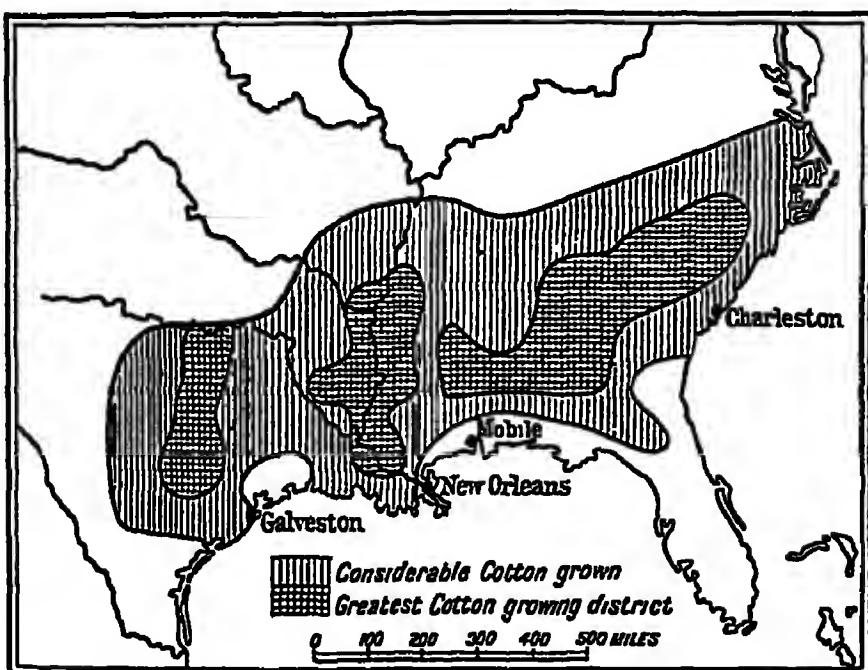


FIG 65—THIS MAP SHOWS THE AREA COVERED BY THE CHIEF COTTON PRODUCING REGION IN THE WORLD

Compare it with the map in your Atlas

The other important regions of this type are found in the Southern Hemisphere, where, partly on account of the narrowing of the land-masses and partly on account of the relief of the land, they are not extensive in area. In South America there is the extreme south of Brazil and part of Uruguay; in South Africa we have Natal and the eastern part of the Cape of Good Hope Province; and in Australia the coastal margins of New South Wales

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and Southern Queensland. The South American region is in its infancy as regards development, and at present grain and animal products dominate everything. In the South African region there are successful plantations of sugar, cotton, tea, bananas, and pineapples, many of which are owned by Indians, who settled in this district in considerable



FIG. 66—HERE WE SEE A MAIZE FIELD IN SOUTHERN QUEENSLAND.

By what other name is maize known? Describe its many uses. Don't be satisfied by merely naming the two obvious uses.

numbers until they were prohibited. Durban is the chief port. Sugar and maize, largely grown to feed cattle, are the chief products of the East Australian region, where Sydney and Brisbane are the principal cities. These South African and East Australian regions contain the chief coalfields of the Southern Hemisphere, and in each there is an important town appropriately named Newcastle.

Most of these monsoon lands of both types,

the tropical and the temperate, offer fairly easy conditions for man, and on that account many of them are densely peopled. They are regions neither of hunger nor privation ; neither of difficulty nor of debilitation. At their best they have something of the human characteristics of the richer Mediterranean lands, for they reward man's efforts by a ready and certain return for his labours, and they give him his reward without compelling him to exert more than moderate effort.

EXERCISES

- 1 Draw diagrams to illustrate the causes of land and sea breezes (see page 146)
- 2 In order to show you how large India is, draw an outline map of Europe and super-impose on it an outline of the Indian Empire drawn to the same scale. Describe your map in writing
- 3 On an outline map of India mark the distribution of the products mentioned on pages 151-154. Also insert the towns mentioned in the text.
- 4 What advantages of site has Delhi over Calcutta ? (see page 154) Are there any disadvantages ?
- 5 Prepare an outline map of China and mark on it all the features (products, towns, etc) mentioned in the section on that country.
6. On an outline map of the British Isles let a small circle, to represent Kaifeng, be marked about the centre of Ireland. On the same scale as the outline map, draw the present and old courses of the Hwang-ho as well as the coastline between the old and the present mouth. This map will give you some idea of what the great change in the course of the Hwang-ho meant.

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7. How do the people of Japan build their houses in order to lessen the effects of the frequent earthquakes to which their country is subject?
8. What are the characteristic features of (i) the climate, (ii) the cultivated products of a country whose climate can be described as of the monsoon type?
9. Can you suggest any reason why the Japanese have made more progress than the Chinese during the last fifty or sixty years?
10. Find out the various means by which the fields of India are supplied with water. Look up particulars of such famous works as the Lloyd Dam, the Lloyd Barrage, and the Wilson Dam.

CHAPTER XI

THE ISLANDS OF THE PACIFIC

IF you look at a globe you will see that the vast Pacific Ocean, which covers over a third of the earth's surface, is almost surrounded by the west coast of the two Americas, the east coast of Asia, the great islands of New Guinea and Australia, and the Antarctic continent. This is shown on Fig 67, but if you study the globe the enclosure of this ocean is much more striking. Fig. 67 shows that the ocean as a whole is a huge, deep basin. All the parts shown in black are about two and a half miles in depth. West of the Philippines a sounding of 5,348 fathoms or 32,088 ft., i.e. over six miles, has been made. Compare this with the height of Mount Everest, the highest mountain in the world, which reaches 29,000 ft.

The islands of the Pacific are innumerable. In groups, in lines, or singly, from the south-east Asiatic and east Australian coast, in a belt on each side of the equator, they extend like stepping-stones two-thirds of the way to America. These islands, though often too small, too rugged, or too little above sea-level to offer to man a home, have been, and still are, of considerable importance, because in the early days of Pacific exploration they were the bait which attracted Europeans to the Pacific

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Ocean, and because in our own times the great countries which lie on its margin are interested in them, for they form stepping-stones from coast to coast for steamships, cables, and wireless stations.

New Zealand is not usually considered with the

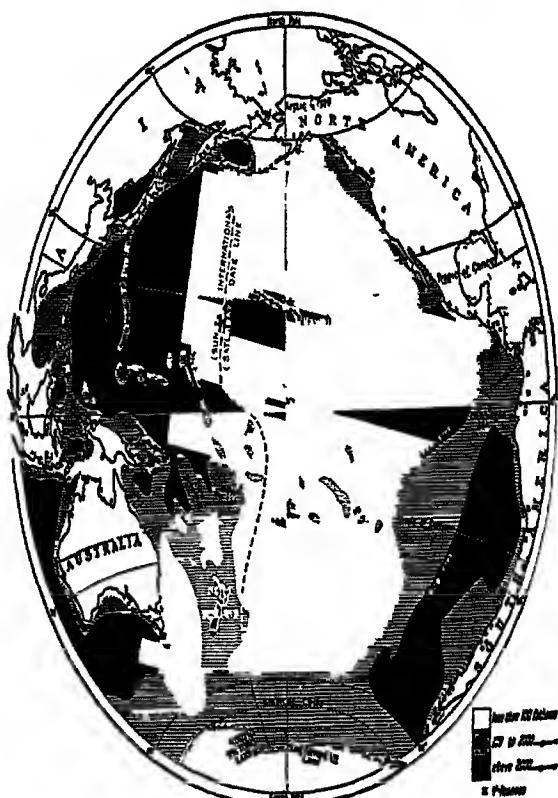


FIG. 67—THE PACIFIC OCEAN

Pacific Islands, but for the purpose of this chapter we shall so consider it. Fig. 67 shows that New Zealand, New Caledonia, and New Guinea lie along a belt of relatively shallow sea to the east of Australia. All these islands are remnants of a continent which once stretched farther eastwards than the

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present Australia. They are, therefore, called "continental" islands, and they are largely built of the same kind of rocks as are found in the world's great continental masses. New Zealand and New Caledonia are thus in a class by themselves.

All the remaining islands can be divided into two classes, those which are volcanic and those which are built of coral. Great disturbances in the earth below the bed of the ocean have caused volcanic materials to be built up in many cases to such a height that they appear above sea-level, and in some cases form very large and even mountainous islands. These are the "high" islands. The coral islands are seldom higher than 12 ft. above sea-level, except where wind and waves have piled up sand or broken up masses of coral. They are the "low" islands. The New Hebrides, the Fiji Islands, the Samoan Islands, and the Hawaiian Islands are examples of "high" islands. The Caroline, Marshall, Gilbert, Cook, and Society Islands are "low" islands. Most of the "high" islands are also fringed by coral reefs. There are thus three kinds of islands: (i) continental, (ii) volcanic, (iii) coral. Let us learn a little about some of the islands belonging to each group.

New Zealand is often stated to be the antipodes of Britain, i.e. the part "opposite to the feet" of people in Britain, but a glance at the map will show that the British Isles lie between 50° and 60° N latitude, whilst New Zealand lies between the 34th and 48th parallels south of the Equator. North Island is in the latitude of Spain, and South Island in the latitude of Northern Spain and France. We have already seen (see page 104) that

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North Island has a modified type of "Mediterranean" climate. South Island has westerly winds at all seasons and its climate has resemblances to that of England.

On the whole, New Zealand is a mountainous country. In South Island the Southern Alps occupy most of the western part and are continued along the south-east of North Island. North Island also contains extensive volcanic areas noted for their hot springs and geysers. Most of the highlands are forested, and valuable timbers are obtained. From the warmer North Island we get the kauri pine, whose wood is very durable and highly prized for house- and ship-building. The softer pine wood of South Island is used for making butter boxes. In the drier parts of both islands, and especially in the Canterbury Plains of South Island, grassland conditions prevail and enormous numbers of sheep are reared and wool and frozen mutton exported (see page 89).

White people of British descent form the majority of the population, and they carry on farming activities very similar to those of the home country, but there are many natives, called Maoris, who are more advanced than the natives of most lands in which Europeans have made their homes. Wellington, owing to its central position on Cook Strait, is the capital; Auckland, which has harbours on both east and west coasts of North Island, is the chief port and largest city; and Lyttelton is the port for Christchurch and the products of the Canterbury Plains.

New Caledonia, so called by Cook on account of its resemblance to Scotland, is about the size of

Wales, but supports only about 50,000 people, many of whom are of convict origin, for the island was used by the French as a penal settlement until some years ago. It is very rich in minerals, especially in nickel, cobalt, and chrome ores, but the ancient rocks of which it is largely composed do not yield a fertile soil, and on this account one-half of the total area cannot be cultivated. Nevertheless, sugar-canies, tobacco, vanilla, pineapples, bananas, and maize are produced, for the island has a much warmer climate than New Zealand. There are pastures in which cattle and sheep are reared. Noumea is the chief settlement.

Of the volcanic islands, the Fijis, the Samoan Islands, and the Hawaiian or Sandwich Islands are the most important. If, owing to the volcanic nature of their islands, the islanders are often terrified by disturbances below the earth's crust, by out-



Photo by New Zealand Government Office
FIG. 68—THIS PICTURE SHOWS US AN ERUPTION OF ONE OF THE GEYSERS IN THE VOLCANIC AREA OF NORTH ISLAND IN NEW ZEALAND

Find out what causes such an eruption

pourings of volcanic material, and by all the terrors associated with volcanic activity, and especially tidal waves, they owe the extraordinary fertility of their islands very largely to the volcanic origin of the soil. The productive soil, a climate of constant warmth and copious rains, and a varied relief combine to give the "high" islands a wide range of vegetable products. The cultivated native plants include coconut, bread-fruit, bananas, taro, and yams. These provide the chief articles of food. Yams and taro are edible tuber roots; bread-fruit, which grows on a tree, is about the size of a pineapple, and must be cooked before it is suitable for food. The great disadvantage of these foods is that in order to obtain sufficient nutriment for the body, large quantities have to be eaten. Children especially suffer, and, since there are few milk-giving animals, so many of them die in infancy that the native population seldom increases in numbers to any appreciable extent. In most of the "high" islands Europeans have introduced plantations of sugar, rice, coffee, cotton, tobacco, and maize, and these are meeting with success. The natives, however, show a disinclination to add rice to their diet.

Suva, in the Fijis; Apia, in the Samoan Islands; and Honolulu, in the Hawaiian group, are the principal ports. A glance at the globe is sufficient to show the special importance of the positions of these groups in relation to the great trade routes and the cable communications of the Pacific. The opening of the Panama Canal has increased their importance in these respects. Britain owns the Fijis, the United States the Hawaiian Islands, and

both countries are interested in the Samoan group, where New Zealand, under a mandate from the League of Nations, rules the former German portion of the group.

The volcanoes of Hawaii deserve a little special mention. The whole island of Hawaii is really a gigantic volcano of a peculiar kind. It is the greatest volcano in the world, for it rises 14,000 ft. above the level of the sea, and 30,000 ft. from the ocean floor. It has two huge volcanic necks—one of which is believed to be extinct. The crater of the other, Mauna Loa, is between two and three miles in diameter, but that of Kilauea, on its



FIG. 69.—SECTION OF A HAWAIIAN CRATER

flank, is better known. It is elliptical in shape, having a longer diameter of three and a half miles and a shorter one of two and a half. Standing on the top of the crater and looking towards the gigantic cauldron, one would see that it is surrounded by precipitous cliff-like walls varying in elevation from 300 to 800 ft. During an eruption lava rises through cracks in the floor, and begins to fill the crater. But before it reaches the lip, thus threatening to overflow, its great weight, aided by the force of steam, causes fissures to appear in the side of the mountain below the crater. The lava finds an outlet through these fissures, which are sometimes beneath the sea, and in this way the crater is gradually emptied. A volcano of this type has what is called a *caldera* crater. The sides of the

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volcano are often stepped (see Fig. 69), due to faulting and consequent collapsing, processes which have caused the crater to assume the shape in which we now find it.

Now let us turn to the "low" islands. They are built of coral, and are low, reef rings enclosing a lagoon. Most of the "high" islands have fringing reefs close to their coasts, but in the case of the coral "atoll" (Fig. 70) the lagoon takes the place of the central volcanic height. One explanation of their origin, given by Darwin, who spoke of them as "those extraordinary rings of land which rise out of the depth of the ocean," is that long ago there was a volcanic island in that place and that around it there grew up a fringing reef. The island subsided, but so slowly that the coral polyps built on the sinking reef fast enough to keep pace with the subsidence, and finally there remained the atoll or coral ring with the lagoon in the centre. Often the ring is broken, and the atoll is then horse-shoe or fret-saw shaped.

At first there can be no life of any kind on an atoll. Gradually, however, the waves break up masses of coral, and heaps of sand are formed. Winds, currents, and birds act as the agents whereby the germs of vegetable and animal life are carried. The coconut palm is the commonest tree, and, as it is not affected by salt, it thrives. Trunks of trees, drifting on the ocean, find a resting-place, and with them come insects and lizards, which form the first inhabitants. Sea birds, and occasionally stray land birds, build in the trees, whilst later comes man, who is enabled to live by means of the coconut tree and by cultivating the soil

produced by the mixture of coral sand and vegetable remains.

Yet these "low" islands, even such giant rings as the Rahiroa atoll, which is a very narrow palm-covered rim of coral, enclosing a lagoon 42 miles long and from 10 to 14 miles wide, afford very little land surface for men's work and for the

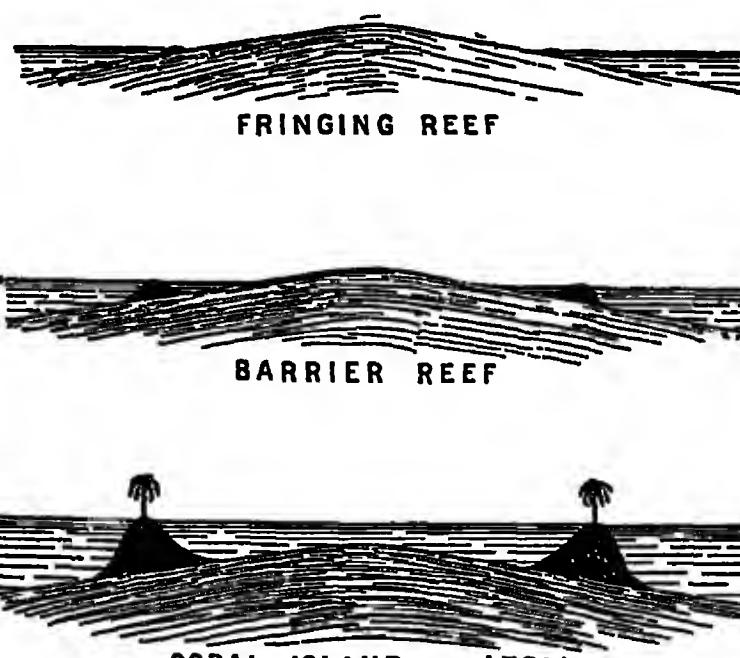


FIG. 70—THREE DIAGRAMS TO ILLUSTRATE DARWIN'S THEORY OF THE FORMATION OF CORAL ISLANDS

production of men's wealth. The food supply, despite the "hot-house" character of the climate, is very poor. The coconut is all-important, and forms with pandanus fruit and fish the chief food. Pandanus fruit resembles a huge raspberry about seven inches in diameter, and each seed is like a shaving-brush dipped in cold cream and sugar. The inhabitants of the "high" islands despise it, but in many of the "low" islands it is a luxury.

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Surplus coconuts are dried and exported as copra, the chief export of the Pacific Islands, to be used in the manufacture of soap and oil.

Very commonly the more backward peoples of the world are referred to as "savages," a word often used for the inhabitants of the Pacific Islands. The word is somewhat unfortunate, for



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FIG. 71.—A TYPICAL SCENE IN A PACIFIC CORAL ATOLI

Note the wind swept coconut palms, the strand of coral sand, the level character of the island

it implies ferocity, whilst, as a matter of fact, few Pacific Islanders are ferocious and none without culture of some kind. Indeed, many of them had reached quite a high state of culture of a self-developed kind before the islands were visited by white races. One writer, Sir Everard im Thurn, says, however, that the "savages" had grown in culture without hitting upon the idea of "duty

to one's neighbours," which idea, however badly it may be observed, is the foundation of civilisation, as opposed to "savagery."

New Zealand is a "white man's land" and can look after itself, but what will be the future of the other Pacific Islands and their inhabitants? First, concerning the people, contact with white men cannot leave them as they were before. On the one hand, missionary societies and wise government measures have done a very great deal of work for their uplift. It is almost incredible to think that it is not very long since a Fijian native king had a small club put in his hand when only seven years of age, and that his task for the day was to kill another boy. This king, Cakoban, died a sincere Christian. On the other hand, new diseases, new drinking habits, and alien customs have been acquired from traders and others, and these have helped sadly to reduce the number of natives.

Concerning the islands themselves, it would appear that those in the neighbourhood of Australia and New Zealand and other large centres of population will become more and more gardens supplying the demand for tropical fruits and products. Many of the smaller islands, even if unfit for agricultural or other development, may be used as cable and wireless telegraphy stations, a use to which a few are already put.

The British Empire, and especially Australia, New Zealand, and Canada; the United States and Japan, are all keenly interested parties in the future of these Pacific stepping-stones. Let us hope that all these powerful countries never forget the interests of the island natives themselves.

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EXERCISES

1. R. L. Stevenson, who spent part of his life in Samoa and who died and was buried there, in writing of the islands of the Pacific Ocean remarks "No distinction is so continually dwelt upon in South Sea talk as that between the 'low' and the 'high' island, and there is none more broadly marked in Nature." Distinguish these two types of islands, showing how they differ in origin, appearance, vegetation, animal life, and economic value.

2. Although in this chapter we have included New Zealand, give as many reasons as you can why New Zealand is unlike the rest of the Pacific Islands mentioned in the chapter.

3. Make a table showing the countries which own the various groups of islands. How did the Japanese obtain their islands?

4. Of what commercial and international value are the Pacific Islands?

5. In Fig. 67 the International Date Line is marked. Find out what it means?

CHAPTER XII.

HIGH MOUNTAIN AND PLATEAU LANDS

We generally look upon mountains as barriers between regions, as hindrances to the free passage of man, animals, and plants. On level plains or on undulating lowlands plants and animals can spread with ease and man is not hampered in his labours. But a high rugged mountain chain forms a barrier to progress, especially in cases like the Pyrenees, where passes are few in number and very high. In the Alps comparatively low passes make it possible to cross the barrier, but it is a barrier all the same. Even the comparatively low Pennines of northern England exert a great influence in many directions because they form a barrier between the lowlands on their east and west flanks.

In this chapter we shall not dwell so much upon the influence of mountains as barriers, but shall consider them as one of the many types of regional homes. Let us illustrate the relation of mountains to the settlement by man. The Alps will be a good example to take, because they rise in the midst of two fairly densely peopled areas, the plain of northern Italy to the south and southern Germany to the north. If you could make a leisurely journey by aeroplane over the Alps from Milan to Munich,

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these are the outstanding features you would see. First, on the level plain of the River Po you would see many towns, villages, and farms, and every sign of a rich region supporting many people. As you approach the foothills of the southern Alps there are fewer people, but where there is sufficient soil the sunny southern slopes will be seen to have mulberry gardens and vineyards, and, in some places, even olives.



FIG. 72.—A TYPICAL MOUNTAIN SCENE

This photograph was taken near Banff on the Canadian Pacific Railway. Note the character of the vegetation.

ledges and patches of deciduous forest. Still higher come the majestic coniferous forests, and here and there, where the trees have been cleared and there is sufficient soil, there are pasture

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lands for cattle and goats. Above the dark line marked out by the pine trees, and between them and the highest parts where snow and ice are found all the year round, are meadows, which, if you made the journey in spring, would be resplendent with beautiful flowers, and, if in winter, covered with snow. No crop can be raised, but cattle and goats are driven there to spend several weeks in the summer. Above the snow-line men cannot find sustenance ; though at places like St. Moritz visitors find pleasure in the winter sports. In crossing the northern margins of the Alps, we should not find the vineyards and mulberry gardens, for the climate is not so warm as on the Italian side, but we should still see the ploughed fields in the valleys, the forest, the summer pastures, and the waste of ice and snow.

What occupations are possible in such a land ? There will be farming in the valley bottom and on the lower slopes, lumbering in the forest belt, and the rearing of cattle and goats, in winter in the valleys, in summer in the high, mountain pastures. A country like Switzerland produces far more milk than is needed to supply the wants of the people, so that much is made into cheese or is condensed and tinned or used in making milk chocolate, and all three are largely exported. The making of articles of kid and morocco leather, from goat-skins, is another manufacturing industry related to the keeping of animals. Forestry occupations are controlled by the Government, because the indiscriminate cutting-down of trees on mountain slopes leads to serious trouble later. Can you see why ? Rye, oats, wheat, and potatoes are the

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chief agricultural crops of the northern and central valleys, but the warmer southern valleys can produce maize as well as the fruits we have mentioned above. Switzerland does not grow enough agricultural produce to support her population and her numerous visitors, and she has, therefore, to

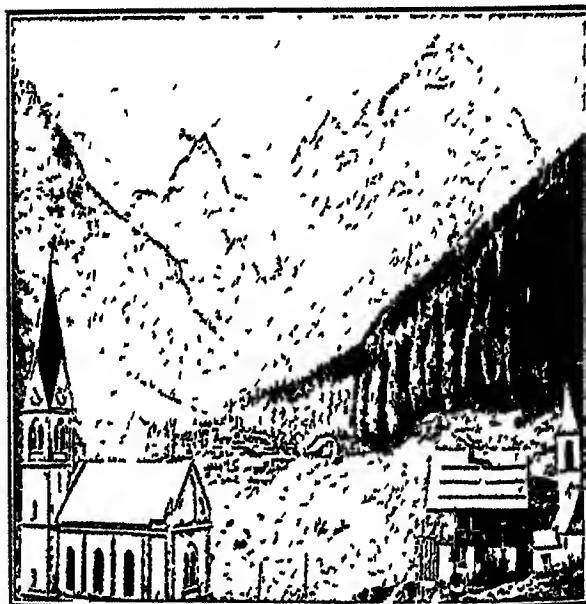


Photo by Swiss Federal Railways

FIG 73.—PHOTOGRAPH OF TROPOI, AN ALPINE VILLAGE HIGH UP IN THE ALPS ON THE ROAD TO THE STELVIO PASS

Note the dark patch of pine forests, the summer pastures, and the wooden buildings

import large quantities of cereals and other food-stuffs.

The mention of visitors recalls one of the chief occupations of many mountain lands. They are summer playgrounds where people from the plains seek refreshment and new vigour amid magnificent mountain scenery. Thousands of men and women are employed as hotel-keepers, servants, waiters,

boatmen, guides, etc. In winter there are winter sports to be enjoyed; in spring the marvellous beauty of the flowers of the high pastures, but it is in summer that mountains receive their greatest number of visitors. The Snowdon district of Wales, the Scottish Highlands, the English Lakeland, the Rockies, the highlands of New England, the Alps, the Pyrenees, the mountains of Australia and New Zealand are all playgrounds. In tropical countries like India, Europeans normally go to hill stations to escape the great summer heat of the cities in the plains, e.g. Poona, Simla, and Darjeeling are all within easy reach of Bombay, Delhi, and Calcutta respectively, and people from those cities can go there for the week-end if they wish.

Many mountain lands have considerably changed in recent years owing to the development of their great resources of water power. Switzerland, without the aid of coal, has become an important manufacturing country. In this she is fortunate, for she has escaped the dirt and soot of older manufacturing areas. The silk-mills of Lyons, Milan, and other cities are largely driven by power derived miles away in Alpine waterfalls. This new and undeveloped source of power will make many changes in mountain lands. Most of them have native crafts and arts in wood, leather, and metal, for the necessity of finding something to occupy the long winter hours has made the people turn their attention to such things. The Swiss have devoted themselves to the large-scale production of clocks, watches, musical-boxes, cotton embroidery, silk goods, etc. Geneva is noted for watches.

Of course, in mountain regions nearer the Equator

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than Switzerland, "warmer" types of vegetation are found at lower altitudes, and the coniferous forests, the high pastures, and the snow-line are all correspondingly higher. Similarly, in the case of mountains nearer the poles than Switzerland, the zones of vegetation on the Swiss mountains are



Photo by Canadian National Railways

FIG 74.—VIEW IN THE FISH MARKET AT PRINCE RUPERT, BRITISH COLUMBIA

The fish in the bins have been unloaded from the boats near by

encountered in lower altitudes. Tea is extensively grown on the lower slopes of the Himalayas and the mountains of Ceylon, while coffee is cultivated in tropical mountain slopes free from frosts. These articles will not grow in Switzerland. Nevertheless the coniferous forest belt and the high summer pastures are found in the Pyrenees, the

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Caucasus, the Himalayas, and other Central Asian mountains, the Andes, the Rockies, and many other important mountain zones, and in all cases we find a very similar type of life—the lumber-man and the hunter of the forest, the shepherd of the pasture lands.

Some mountainous districts border the sea, e.g. Norway, Dalmatia, Greece, northern Scotland,

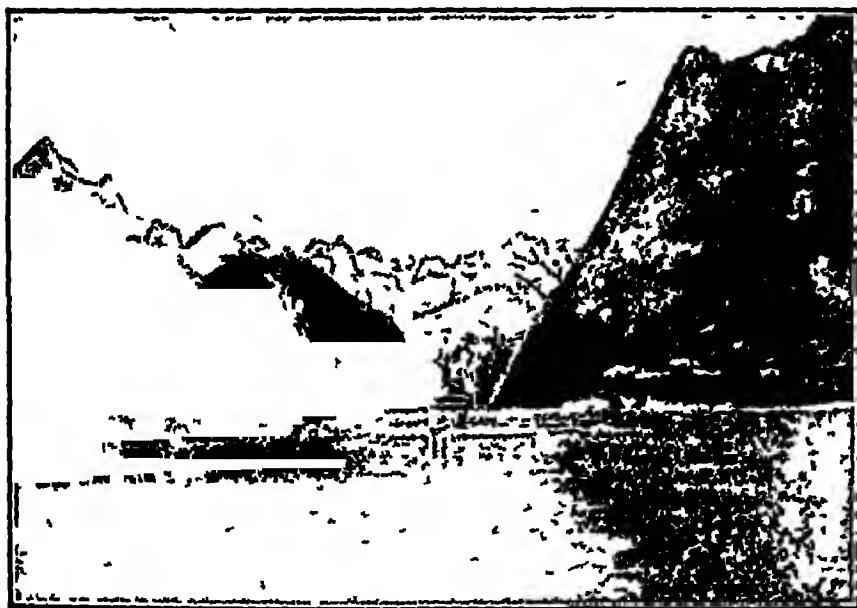


Photo by Norwegian State Railways

FIG 75—THIS PHOTOGRAPH SHOWS A STEAMER ENTERING ONE OF THE NUMEROUS FJORDS ALONG THE COAST OF NORWAY

British Columbia. In such circumstances the sea forms a great source of attraction to the inhabitants, who engage in seafaring professions and in fishing. In Norway there is very little agricultural land; just a few coastal districts and the small patches at the head of the fiords. The mass of the country is high and inhospitable, and cannot support all the growing young men and women. These are either forced on to the sea for a living—and we

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know from history what sea rovers the Norsemen were—or they leave the motherland and seek new homes in foreign countries. The Norwegians have also become important ocean carriers, many of their vessels being large wooden sailing-ships. The development of hydro-electric power and the consequent introduction of manufacturing industries are doing something to stem the tide of emigration from mountain lands, but it still goes on to a considerable extent.

Looking at the matter from the standpoint of human geography, it is not timber, fish, and such-like things that constitute the principal contribution of lands like Norway, Wales, and Scotland to the world as a whole. Their chief contribution, their chief export, is men and women, hardened by the rigours of a mountain life and able to hold their own in the life of the plains. In the autumn the Swiss descend the mountains from hotels and summer pastures in great numbers and seek situations in the cities. Working in the cities in the winter, and returning in the summer with the wages earned, noticeably enriches the home districts. But such migrations are seasonal. There is a constant stream of emigration from the Italian Alps to Marseilles, Geneva, Milan, and other north Italian cities. Geneva, once the centre of Calvinism, is to-day a Catholic city, owing to the influx of Catholic labourers from Alpine Savoy. The Chinese provinces of Chili and Manchuria have been considerably settled by immigrants from the mountain peninsula of Shantung, and thus Manchuria has been changed from an alien to a native Chinese district. Scotsmen, of Highland birth, are scattered

all over the world, and they and Welshmen are present in large numbers in London and other English lowland cities.

But we must not forget that most mountain people are in their mountain homes because they have been driven there by stronger invaders of the lowlands. Thus the English tribes drove the native British westwards into Wales. In this way mountain valleys serve as refuges where a people may remain unmolested, holding little or no intercourse with the outside world. That is why mountains are often "Treasure Houses of the Past" and "Homes of Lost Causes," where old customs and languages persist for a long time. Modern communications by rail, motor-car, telegraph, and wireless are bringing about great changes, and many old customs are rapidly dying. Nevertheless, it is well for us to realise these things and to make allowance for them. Let us keep in our minds the picture of mountain lands as lands of difficulty where, unless valuable mineral wealth has been found or hydro-electric power has come to aid them, men and women have to work hard to win a living, and in which many of them cannot be supported at all, and are exported either to the life of the plains or to the new lands beyond the sea.

Now let us turn to the world's regions of high plateaus. These are chiefly found in association with the great mountain chains of Central Asia and the Americas. The best Asiatic example is Tibet, a plateau land raised nearly three miles above sea-level and enclosed on all sides by higher mountain ranges. The northern and larger part of Tibet is a bleak, wind-swept, barren, inhospitable plateau,

inhabited only by a few scattered nomads who obtain a livelihood by pasturing yaks, goats and sheep, and, in some parts, camels. The yak is to the Tibetan what the reindeer is to the men of the tundra. It supplies him with food and clothing, and it is his chief beast of burden. In northern Tibet it is possible to travel for weeks without seeing any sign of human beings. In the south, where the elevation is less, is the real Tibet, a country of long river valleys, enjoying a genial climate and supporting a settled population of farmers, and of broad upland pastures and mountain ranges where roaming herdsmen graze their herds and flocks.

The chief of these sheltered valleys is that of the San-po, the Tibetan name of the Upper Brahmaputra. In this and other valleys, owing to the presence of alluvial soil, it is possible, by irrigation, to grow fruits such as apricots and peaches, as well as wheat, barley, and peas. Pastoral occupations are also carried on. One traveller who climbed from the plains of India to Tibet, through Sikkim, described his feelings upon crossing the last Himalayan ridge and attaining the plateau to the north, as follows. "To feel its charm one must have first undergone the discomfort of the long journey through the heat and steam and torrential rain of the jungles of the foothills ; one must have felt the disappointment of the views of the snows hidden so persistently in cloud and mist ; one must have scrambled through the deep ravines of Sikkim with their dense forests and rampant leech-infested bamboo thickets Then, after these days of hard travelling are over, one crosses the pass over

the dividing range and steps in one moment into a totally different land. A high plateau-land of broad, open valleys and rounded, snow-capped hills, a land of luxuriant pasturages, of yaks and sheep and perpetual sunshine."

Lhasa, the Tibetan capital, is situated in one of these valleys. What seemed to have made the greatest impression on the members of the British Mission which went to Lhasa in 1904—very few people have been in Forbidden Tibet—was the dirty state of most Tibetans and their villages and their extraordinary religious beliefs. The prevailing religion is a degraded form of Buddhism, which is frequently little better than devil-worship. Every dark spot—a cave, a hole in the wall, a crack in a rock—is filled with evil spirits who must be kept off, and in order to do this, strings of flags, prayer poles, and many other devices are used. There is a very great difference between the lives of the people and those of the priests, of whom there are a tremendous number—twenty-five thousand in Lhasa alone.

On the Andean plateau of Peru and Bolivia the climatic conditions are not so extreme as in Tibet, for that land is near the centre of a vast land mass, whilst the Andean plateau is situated nearer the Equator, in a narrowing continent. It is about two and a half miles high, with peaks considerably over 20,000 ft. in the marginal mountains. As in Tibet, and as a matter of fact in all plateaus bordered by mountain ranges, the rainfall is small, with the result that trees are uncommon and there is little vegetation other than grass. This has determined that pastoral pursuits shall be an important occupa-

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tion. Cattle and sheep are reared, as well as large numbers of llamas, alpacas, and vicunas. Llamas are of great importance as beasts of burden. They are sure-footed and can follow mountain paths where ordinary means of communication are difficult. The wool of sheep, llamas, alpacas, and vicunas is used for making clothing.

The mineral wealth of the Peru-Bolivian plateau



Photo by Evangelical Union of South America

FIG. 76.—PHOTOGRAPH OF AREQUIPA ON THE ANDEAN PLATEAU OF PERU

The volcano, El Misti, is just over 20,000 ft. above sea-level. What do you notice about the river?

is enormous. The most famous silver-mines of history are those of Potosi, in Bolivia. It has been estimated that silver to the value of over £600,000,000 has been extracted from them since their discovery in 1545. Silver is also mined at Cerro de Pasco, in Peru. Besides silver, the plateau is also rich in tin and copper. The development of the mineral and other resources of high plateaus like those of Peru and Bolivia is retarded by the

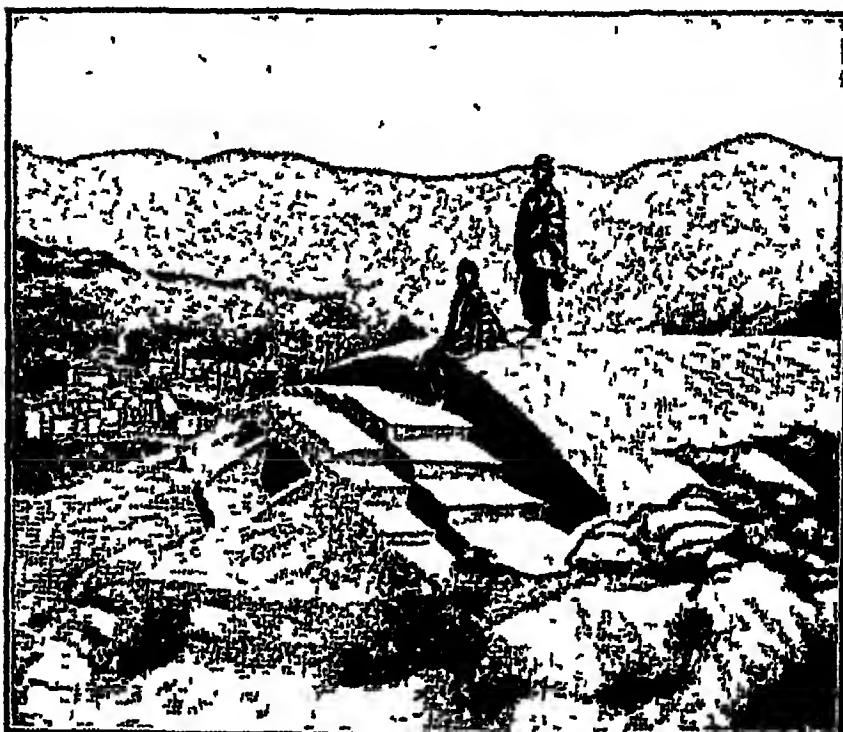
difficulty of the climate. At an elevation of two and a half miles the air pressure is much less than at sea-level, and people used to life at lower altitudes suffer very considerably. They often experience intense headache, vomiting, blueness of the lips and fingers, breathing distress, and great prostration, sometimes leading to unconsciousness. That is why travellers going to the high plateaus of Peru and Bolivia by one of the many lines which connect them with ports on the west coast are recommended to make the journey in stages. In such atmospheric conditions white people cannot do the heavy work of the mines, whilst the native Indians show little inclination for such tasks.

Of course, mountain-dwellers suffer from "mountain sickness" too. You will probably remember that the Mount Everest climbing party was equipped with oxygen apparatus for use at high altitudes. But among the worst features of many of the towns on the Andean plateaus are the appalling sanitary arrangements. Typhoid, pneumonia, and dysentery are common, and carry off large numbers of natives, who cannot stand the extra strain placed upon the heart by the rarefied atmosphere.

When Spaniards first came to the plateaus of Peru and Bolivia, they found an even more advanced Indian civilisation than they had seen in Mexico. The Inca Indians had built many great cities, the chief being Cuzco, from which excellent roads led to all parts of their empire. Splendid bridges carried these roads across rivers and gorges, beautiful temples and palaces adorned their cities, and aqueducts carried supplies of water from neigh-

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boiling mountains to cities and fields. Their chief occupation was agriculture, and they grew far more maize than the region produces now. Wool was obtained from their flocks of alpacas and llamas, and beautifully designed cloths were woven by the women. Many of these temples, aqueducts,



Photo, Evangelical Union of S America

FIG. 77.—HERE WE SEE A PHOTOGRAPH OF TWO INDIANS AND SOME OF THE INCA REMAINS NEAR CUZCO, THE ANCIENT INCA CAPITAL

etc., remain to this day. In fact, the Spanish city of Cuzco is built upon the old Inca foundations. It is amazing that such a small body of men as was commanded by Pizarro and other Spanish conquerors could work the havoc they did among a large population. But the Incas were peaceful and unused to war, to intercourse with men from the outside world, to the strange and fearsome

arms used by the Spaniards, and, above all, to Spanish treachery.

Lima, with its magnificent cathedral and its houses of mud bricks, is the capital of Peru. Its port is Callao. La Paz, south-east of Lake Titicaca, a centre of inland drainage, is the Bolivian capital.

North of Peru is the plateau of Ecuador, whose capital, Quito, which is within fifteen miles of the Equator and was the northern capital of the Incas, has an equable and regular climate. The mean annual temperature at Quito is 58° F., the maximum annual temperature is 70° F., and the minimum annual temperature 45° F., whilst the average range in the twenty-four hours is 10° F. The more equable and congenial conditions than those of the plateaus of Peru and Bolivia are, of course, due to its nearness to the Equator. Pastoral occupations, however, as in the other plateaus, are an important pursuit of the inhabitants, who are also engaged in the growing of temperate fruits, vegetables, and cereals, wherever gardens and fields can be irrigated. This is necessary, for the plateaus, especially in the dry season when the dust is almost unbearable, are lacking in moisture and trees are scarce.

In North America the western Cordillera contains great plateaus. That of the Colorado, with its wonderful canyon, we have already described in the chapter on deserts. The whole Cordillera, from Alaska to the Gulf of Tehuantepec in southern Mexico, contains high plateaus in its central parts. In temperate British Columbia pasture lands for sheep and cattle are found in the dry intermont

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plateaus, but in recent years the introduction of schemes of irrigation has rapidly extended the area of cultivable land, and there are now large tracts producing fruit. Farther south the Snake River has cut a deep canyon, and large areas are semi-desert and almost useless. Between the Wasatch Mountains



Photo by British Columbia Government Office

FIG 78—THIS PHOTOGRAPH IS TYPICAL OF THE FRUIT FARMS NOW BEING ESTABLISHED IN THE COMPARATIVELY DRY PLATEAUS BETWEEN THE MOUNTAIN RANGES OF BRITISH COLUMBIA

How is water brought to the trees? Is it possible to cultivate other plants as well as the large fruit-trees?

and the Sierra Nevadas lies the arid Great Salt Basin, whose lake may be compared with Lake Titicaca in Bolivia. Salt Lake City is the chief centre of a peculiar religious sect called the Mormons. Whatever may be said about their religion, Mormons are good farmers, and they have reclaimed by careful irrigation many former waste tracks.

Most people in Mexico live in the southern part

of the plateau, where, at an elevation of about 8,000 ft. above sea-level, the climate is suitable for human settlement, the volcanic soil is rich, and water can be obtained from the snows and rains which fall on the neighbouring mountains. Wheat, maize, beans, and temperate fruits are extensively grown and a large population is supported. It was here that the Spaniards found the advanced Aztec civilisation when they conquered Mexico in the early sixteenth century. Mexico City, the chief town and the capital of the whole country, is built on the site of the old Aztec capital. As in the case of Quito, excellent views of great volcanoes can be obtained from the streets of Mexico City.

We will conclude the chapter by a short reference to the African plateau country of Abyssinia. The greater part of the country consists of a plateau built up of sheets of volcanic rock in which the rivers have cut deep gorges which offer very poor means of communication, so that intercourse is difficult, not only with the outside world, but also between different parts of the country. The Abyssinians have lived for centuries surrounded by enemies, and have never had time to turn their attention to peaceful development. They have had all their ports and their coastline taken away, and so have been cut off from the world and from progress; and their ships, which centuries ago traded on the Red Sea and the Indian Ocean, are now dim memories.

No wonder that they are intensely jealous and fearful of any encroachment on their independence, for, like all highlanders, they love their country. They are immensely proud of the military prowess

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which has maintained their independence. Every man carries a rifle and a bandolier full of cartridges, which may or may not fit. If he is an important person, he is followed by armed servants who resemble a travelling armoury. The country could produce infinitely more than it does at present. The lower lands and the lower slopes of the plateaus could grow more coffee, cotton, and fruits, and on the higher plateaus the herds of cattle, sheep, and goats could easily be multiplied. The Abyssinians, however, appear to have enough for their own modest requirements, and no increase is attempted. In almost everything the country is backward.

The capital, Addis Ababa, according to one traveller, gives shelter to from fifty to sixty thousand persons, but is entirely without sanitary arrangements or water supply. Nevertheless, he says it is a fascinating town, bowered in trees, traversed by a number of fair roads, intersected by rivers, which are spanned by some European-built bridges. Its main architectural feature is the Church of St. George, and it contains quite a passable hotel, which was built as a speculation by the late emperor, and furnished largely out of presents made by foreign representatives. The town is now reached by a narrow-gauge railway from the French port of Jibuti, situated near the entrance to the Red Sea.

Thus we see that high plateau lands differ very much in value to man. Northern Tibet is like the tundra, a land of hunger and privation; so are some of the higher and bleaker Andean lands. Lands like the valleys of southern Tibet, the old "Inca lands" of South America; the "Aztec

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lands" of southern Mexico; the Salt Lake City region, and the intermont plateau valleys of British Columbia, are all lands where man can live a settled life based on agriculture, provided he will take the pains to construct irrigation works. In some of their drier parts, and away from irrigated areas, they form dry pastures for cattle, sheep, yaks, llamas, etc. In many parts minerals have been found. In British Columbia, Utah, and Mexico the climatic conditions do not present the very serious difficulty we have noted in connection with the Peruvian and Bolivian plateaus, and there are prosperous mining settlements.

On the whole, however, we find that mountains and high plateaus are difficult homes for man, and that, as a general rule, their population will be relatively small and the countries themselves relatively unimportant.

EXERCISES

1. Give some account of the annual migration of Swiss shepherds and their cattle and goats from the lower lands to the high mountain pastures, find out the dates, etc. How are the cattle fed in the winter-time? Where do the shepherds live in the summer-time?

2. Make a list of the chief Swiss holiday centres. To which of these would you go (a) for a quiet holiday in the Italian lakes, (b) for a mountaineering holiday, (c) for winter sports?

3. Why is it possible to describe mountain lands as "Homes of lost causes"?

4. Give examples of mountain lands which have undergone change in recent years owing to the development of manufacturing industries based on hydro-electric power.

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5. Why do we find a relatively large emigration from mountain lands ? Give examples.
6. How are the natives of high plateaus, e.g. Bolivia, physically suited for life in a rarefied atmosphere ?
7. Why is it that mountainous lands are frequently rich in minerals ? Draw a diagram to illustrate your answer.
8. Compare (a) life on the Bolivian plateau with that on the pampas of Argentina ; (b) life on the northern plateau of Tibet with that in its southern valleys.
9. In what way is it true to say that the most important export of areas like Norway or the Highlands of Scotland is men and women ?

CHAPTER XIII

THE INDUSTRIAL REGIONS OF EUROPE

WE have now covered all the great natural regions of the world. We have learned about Eskimos and Samoyedes in the cold north ; the trappers and lumber-men of the northern forests ; the herdsmen and farmers of the grasslands ; the desert nomads and oasis dwellers ; the negroes of Africa ; the Indians of the Americas ; and of many other peoples. Here and there we have noticed that manufacturing of one kind and another is engaged in, as for example in Switzerland and Japan, but we have left the world's two greatest manufacturing and industrial areas, those of Europe and North America, until this point in our study. Industrial areas are really a special kind of natural region.

Have you ever visited a modern industrial region ? If you have seen the South Wales coalfield, the Lancashire cotton towns, the Yorkshire woollen towns, the Tyneside or Clydeside shipbuilding and engineering districts, the " Black Country " of the Birmingham district, or the Staffordshire pottery towns, you will know what is meant by the term. It is a region in which the bulk of the people work in large factories or workshops around which are the dwellings of the workers. In all the areas just mentioned coal is mined in the region, there are

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great iron works, and the smoke and dirt from the hundreds of small chimneys make everything look gloomy. Such regions are very different from the peaceful landscape of the countryside, yet not very long ago they too were as beautiful.

What has brought about these changes? Before



Photo by Central Acrophoto Co

FIG. 79.—PHOTOGRAPH TAKEN FROM THE AIR OVER PART OF HUDDERSFIELD, THE WEST RIDING WOOLLEN MANUFACTURING TOWN

Note the market place in the bottom left hand corner, the round building on the right, which is the Exchange, and the "mill area" on the outskirts. Huddersfield is among the cleanest of the Northern industrial towns

they occurred, there was a certain amount of manufacturing done by hand and simple hand-worked machinery, and in many homes the women and girls engaged in hand-spinning and weaving. But the second half of the eighteenth century saw many marvellous inventions which changed industry from hand production to large-scale production

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by means of machinery Hargreaves invented his "spinning jenny," Arkwright his water-power frame, Crompton his "spinning mule," Cartwright his "power loom," and Watt his steam-engine. These and other inventions required coal and iron, and so men learned not only how to dig deep holes

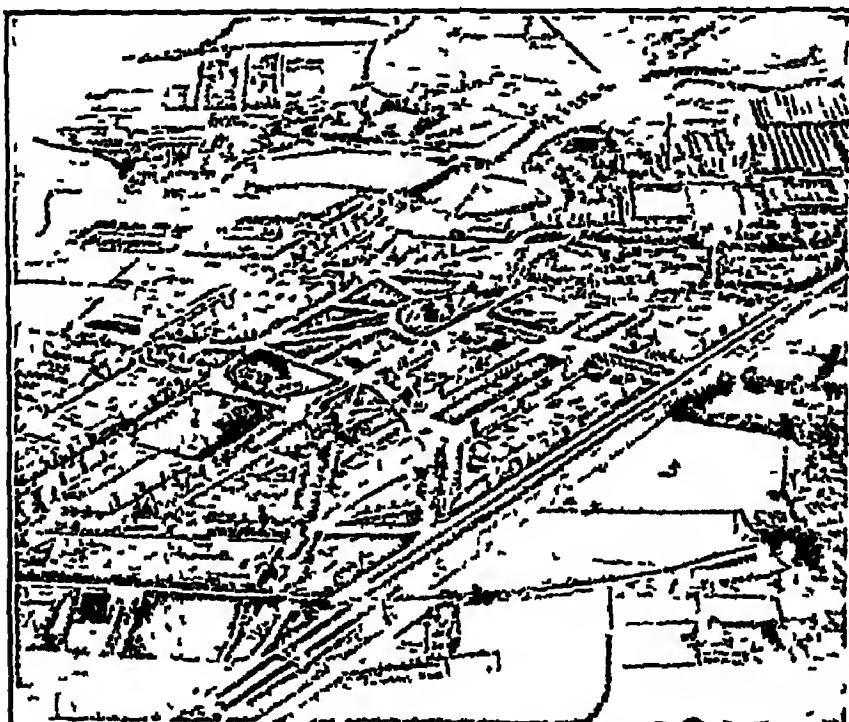


Photo by Messrs Lever Bros

FIG. 80.—IN THIS PHOTOGRAPH WE HAVE AN AIR VIEW OF PORT SUNLIGHT, A NEW TYPE OF INDUSTRIAL TOWN PLANNED UNDER MODERN CONDITIONS ON "GARDEN CITY" LINES

The works of Messrs Lever Bros, the famous soap manufacturers, are seen in the top right hand corner Compare this with the view over Huddersfield

or "shafts" into the earth and bring from below millions of tons of coal, but discovered improved methods of smelting iron, as well as how to drive trains and boats by steam and how to construct canals and stronger bridges and roads. With the aid of the coal and iron they manufactured all kinds of goods of iron and steel, wool and cotton.

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New, large towns grew up on or near the coal-fields. Near the sea other large towns have grown up as ports for exporting the manufactured goods to distant lands and importing raw material—cotton, wool, iron ore—to be made into cloth and steel in the big towns of the coalfields. Millions of people now live, not by fishing or farming, but by mining or manufacturing. Without the miners most, if not all, of these changes could not have taken place. Coal! coal! coal! that is the cry of the modern world, though for some purposes oil is more valuable than coal.

These great changes, known in your history books as the Industrial Revolution, first came to our own country, and then spread to Belgium, France, Germany, and other European countries, and also to parts of North America. We shall learn about the American region in the next chapter.

Fig 83 shows the chief European coalfields, and it is mainly around these that the large centres of population are gathered, as will be seen if the two maps are compared. A vast population of many nationalities stretches from the west of England in a south-easterly direction along the flanks of the Central European highlands with which the coalfields are associated. But the industrial belt includes not merely the coalfields; it includes many of the mountain coal-less areas themselves, for here we find supplies of hydro-electric power which have been considerably developed as we learned in earlier chapters, in Italy and Switzerland, where the dirt and grime of the coal towns are fortunately missing. This great industrial

belt will before long be continued to the Black Sea, for the Donetz Coalfield in South Russia—the largest coalfield in Europe—is undergoing rapid development. Let us now survey very briefly the principal European Industrial Regions. We will take those in Britain first.

In Book I of this series the work and lives of South Wales miners were described. In Book II the Industrial Regions of Britain were studied in some detail, so that it is not necessary to cover all the same ground in this volume. Fig. 81 shows the English coalfields. Let us take some of the larger ones and examine their particular conditions and the industries. The Northumberland and Durham coalfield extends to the sea, and has flowing across it the Rivers Tyne and Tees. The coalfield has therefore a good waterway and ready access to the sea. Most of the countries round the North Sea, and of course London and the south of England, have little or no coal, so that one great industry is the mining of coal for export. There is this great advantage, too, that from the forests of Norway, Sweden, Finland, and Russia the returning ships can bring pit-props for the collieries as well as timber for other purposes.

A little to the south of the coalfields, the oolitic limestone hills that stretch across the English Plain terminate in the Cleveland Hills, which contain rich iron-ores. Middlesbrough and district are thus engaged in the iron and steel industry, and this, combined with the facilities of the Tyne waterway, has given rise to shipbuilding. This industry requires not only the enormous plates of which a ship is made, but engines of all kinds, whilst

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war-vessels also need armour plate and guns. Newcastle, Gateshead, Tynemouth, North Shields, and South Shields are but the largest towns along a river whose banks form one long busy scene of shipping and shipbuilding.

Farther to the south lies the second of the eastern Pennine coalfields, known as the York, Derby, and Nottingham coalfield. This stands much nearer to the Pennines and is separated from the sea by the Vale of York and the hills of eastern Yorkshire—the Wolds and the Moors. The Pennine moors and dales, the Moors and the Wolds form pasture for sheep whose fleeces supply large quantities of wool. In the West Riding, as in other regions, woollen goods were manufactured even before the new uses of coal were discovered. Then, as we have seen, coal became the deciding factor in industry on a large scale, so that to-day the woollen industry of the West Riding towers high above such woollen industries as are established in Somerset and Gloucestershire and in the valley of the Tweed. Leeds and Bradford form the centre of the group of woollen towns, where the occupations are not only spinning and weaving and the making of clothing, but the manufacture of the machines—engines, spinning machines, and weaving looms—that are required to carry on the woollen industry.

So great is the demand for wool that the English supply is totally inadequate. From the sheeplands of Canada, New Zealand, Australia, and South America raw wool is brought for manufacture in Yorkshire. Similarly the amount of cloth made far exceeds the quantity required in

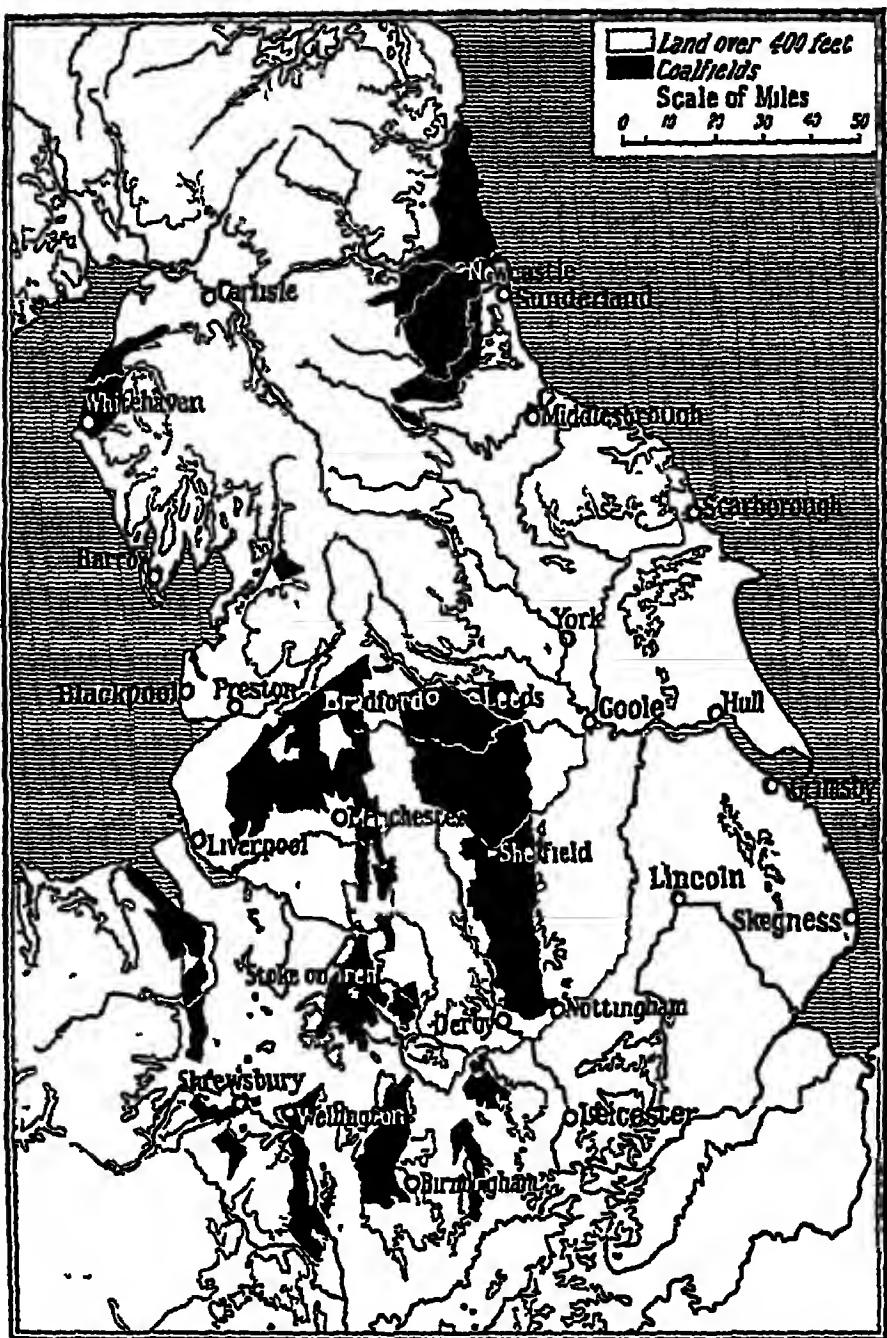


FIG 8r—THE ENGLISH COALFIELDS
Notice their relation to the relief of the road

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Britain ; much therefore has to be exported to foreign markets.

So far we have thought only of the northern portion. Farther south in the same coalfield, extending from the neighbourhood of Sheffield through Chesterfield to Derby, the coal is utilised largely for the smelting of iron and the manufacture of steel. Derby makes railway locomotives and waggons, as well as girders, cranes, and steel goods to be used by other manufacturers in the making of other machines. Sheffield has special works for guns and armour plate, and has long been the British centre for the manufacture of cutlery. Nottingham has for many years had lace and hosiery works and recently has developed large engineering works in addition.

West of the Pennines lies the large coalfield which is the western counterpart of that of the West Riding—the South Lancashire coalfield. Here is a coalfield with a humid atmosphere, and numerous streams with excellent water for dyeing and bleaching, both of which are factors of great importance in cotton manufacturing. At the present time the spinning is done largely in a group of towns which includes Oldham, Bolton, Ashton-under-Lyne, and Stockport. Farther north are the weaving and dyeing towns of Burnley and Blackburn. Manchester, itself, though the centre of the cotton industry, does not manufacture the cotton goods. It is the business centre where cotton is bought and sold. It has also great engineering works, while the cutting of the Ship Canal has made it a port for both cotton and other goods. Thirty miles away stands Liverpool, the great west coast port having

trade connections not with South Lancashire only but with the whole of Britain.

North Staffordshire is the great pottery district with Stoke as the centre. Not only have the local clays been used for the manufacture of all kinds of earthenware, but china-ware is now made from china clay or kaolin brought from Cornwall.

Farther still to the south is one large coalfield within the north-west region of the Plain of England. The "Black Country" with Birmingham as a centre has long been connected with the iron industry, though only with the modern use of coal has it grown to such proportions and really become the "Black Country." Iron and steel and other metal goods form the principal industries of Birmingham and such surrounding towns as Wolverhampton, West Bromwich, Dudley, and Coventry.

In South Wales between the Brecon Beacons and the sea a great basin of excellent coal lies below the surface rocks occupying approximately the county of Glamorgan. The rivers flow in a general direction from north to south and along their valleys many collieries and mining villages have sprung up, and busy railways carry the coal to the ports.

The abundance of local coal and iron, and the comparatively near supply of Cornish copper, lead, tin, and zinc, gave to South Wales a special interest in the smelting of metals and the manufacture of metal goods. As the industries grew and local supplies failed or were not sufficient, ores could be brought from foreign countries with comparative ease. Moreover, coal always formed a ready cargo for ships to take back, for coal is useful every-

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where and few places are so well off for coal as Britain.

Dowlais and Merthyr Tydvil in the north of the

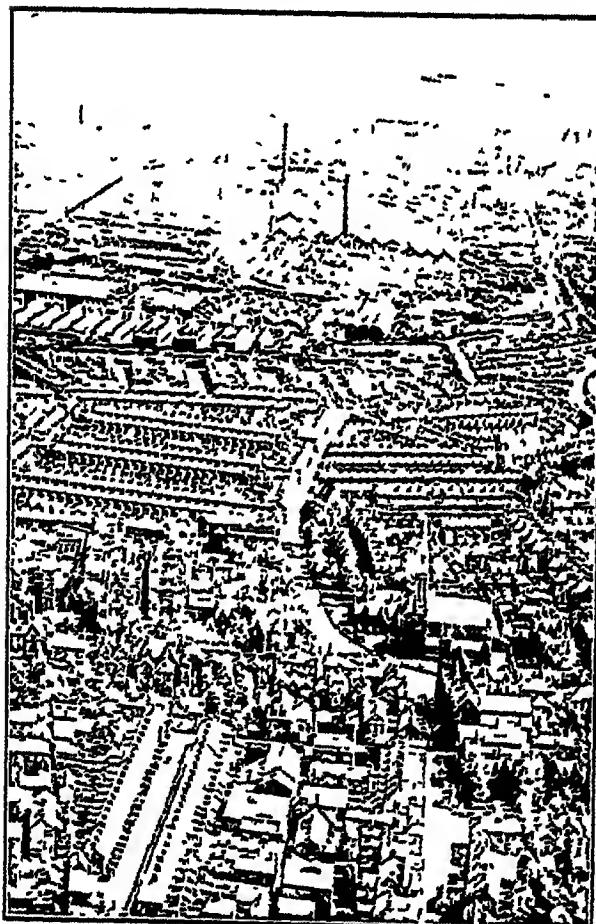


Photo by Central Aerophoto Co

FIG. 82.—A PORTION OF CARDIFF TAKEN FROM THE AIR.

Compare the character of that part of the city shown in the top half of the picture with the lower half. In what direction was the view taken? Compare with Figs. 79 and 80.

coalfield have the largest iron-smelting works. At the ports, particularly Swansea and Cardiff, in addition to iron-smelting, there are works for the smelting and manufacture of copper, tin, zinc, and

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lead. In modern times there is a great demand for copper, either in the form of sheets or wire, for very many purposes, one of which is for electrical apparatus and equipment. One of the difficulties with iron is that it so readily rusts in air. Bridges and exposed iron-ware must be painted constantly, and thin iron soon rusts into holes. An exceedingly fine covering of tin or zinc will prevent the air acting on the iron and so preserve it for a very long time. Tin plating and zinc plating are two other important industries, making possible the use of iron in innumerable ways as "tins," galvanised iron, and wires. Mining and the metal trades are the characteristic industries of South Wales and coal is its principal export.

The Scottish coalfields are found in the Central Lowlands. The principal coalfield is the one that extends from the River Clyde eastwards almost to the Forth. Collieries, blast-furnaces, iron and steel works find employment for thousands of workers. Consequently there is a cluster of mining and manufacturing towns, where bridges, girders, railway waggons, locomotives, and rails are some of the goods manufactured. We have seen in the case of the Tyne that shipbuilding could be carried on if a suitable waterway were near the iron-works. The Clyde from Glasgow to Greenock has very many shipbuilding yards, where steel plates and enormous engines are required for the numerous ships annually launched on the Clyde.

The small coalfield in Ayrshire on the west supplies the coal for some important engineering works, and also exports coal to Belfast and north-east Ireland. In the east, both north and south of

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the Firth of Forth, is another coalfield of considerable importance. From some of the coal oil is obtained, while some coal is exported. The group of Fifeshire towns of which Kirkcaldy is the chief manufactures linoleum and similar goods, while Dundee farther north manufactures hemp and jute goods, such as ropes, sailcloth, and sacks.

We have now surveyed the principal industrial regions of Britain, but, of course, there are many towns away from the coalfields in which great manufacturing industries have grown up. London is a most important manufacturing centre for iron goods, furniture, clothing, chemicals, and railway plant. Indeed, it is not generally realised that London is one of the largest engineering centres in the world; that the number of Londoners dependent on the leather industry exceeds the population of Northampton, and that the London printing trade employs an aggregate larger than the population of either Yarmouth or Chester. The port of Bristol has tobacco, sugar-refining, and chocolate works. Luton manufactures straw hats; Northampton and Leicester boots and shoes. Lincoln, Grantham, Peterborough, Bedford, Chelmsford, Ipswich, and many other market centres have important iron-works largely engaged in the manufacture of agricultural implements. Perhaps you can find a reason for the location of these industries in the towns mentioned.

Let us now turn to the great industrial regions on the continent of Europe. We have already noticed a series of coalfields along the northern margins of the highlands of Central Europe (see

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Fig. 83). From west to east the first one we come to is one of the most important. It lies along the margins of the Ardennes highlands and stretches across southern Belgium with extensions into France and Germany. Some iron is mined locally, but much has to be obtained from Lorraine and Luxembourg. The chief French textile industries are located on the French part of the coalfield, and much more flax and wool are required than can be produced locally, so that these articles have to be imported, the raw wool very largely from Argentina. France is not so fortunate as Britain in the possession of wool-producing colonies. Rouen, a great port and the centre of cotton manufacturing, is some distance from the coalfield, but the raw cotton comes direct to the town from abroad. On the coalfields are Lille, which makes iron, woollen, and cotton goods, Valenciennes, which specialises in lace, Cambrai, noted for its linens, and St. Quentin for its cotton cloth.

In Belgium, the country with a greater number of people per square mile than any other in Europe, Mons and Charleroi are great mining and iron manufacturing centres, Liége manufactures machinery, ordnance, steel rails, and other articles of steel and iron, while Namur, particularly noted for its cutlery, is also a famous engineering centre. Ghent, Courtrai, and Tournai are textile towns manufacturing linen from flax grown locally. Ghent is also able to import raw cotton easily, and is the chief Belgian cotton manufacturing town Brussels, the capital, is noted for carpets. These textile towns and Brussels are not on the coalfield, but are sufficiently near to obtain coal with ease. The

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possession of rich coalfields has made Belgium an important industrial country, whilst her northern neighbour, Holland, which has practically no coal, has declined in power since the dawning of the days of coal and iron, her present importance arising from her agriculture and horticulture, her large colonial empire, and the traffic of the Rhine.

Germany has several important industrial regions, and like Belgium and Britain she is predominantly an industrial country. The German coalfields also lie on the margins of the Highlands. Near the Belgian frontier where the Belgian coalfields extend into Germany stands Aachen, noted for its woollen goods, particularly blankets and broadcloths. Farther east across the Rhine we find the chief German industrial region in the coalfields of the Ruhr basin. The Ruhr is a tributary of the Rhine. The great waterway of the Rhine, the numerous canals, and the excellent railway facilities make the importation and distribution of the imported ores from Sweden and elsewhere a matter of comparative ease. The same facilities assist the importation of raw materials for the textile trades and of grain for food. It is unfortunate for Germany that the mouth of the Rhine is in another country. The vast Krupp iron and steel works are at Essen; at Dortmund and Dusseldorf all kinds of hardware are made, whilst Solingen is noted for its cutlery. The twin city of Elberfeld-Barmen manufactures chemicals, but is more noted for its silk, cotton, and woollen goods. Krefeld is one of the chief silk manufacturing towns in Europe; Dusseldorf and

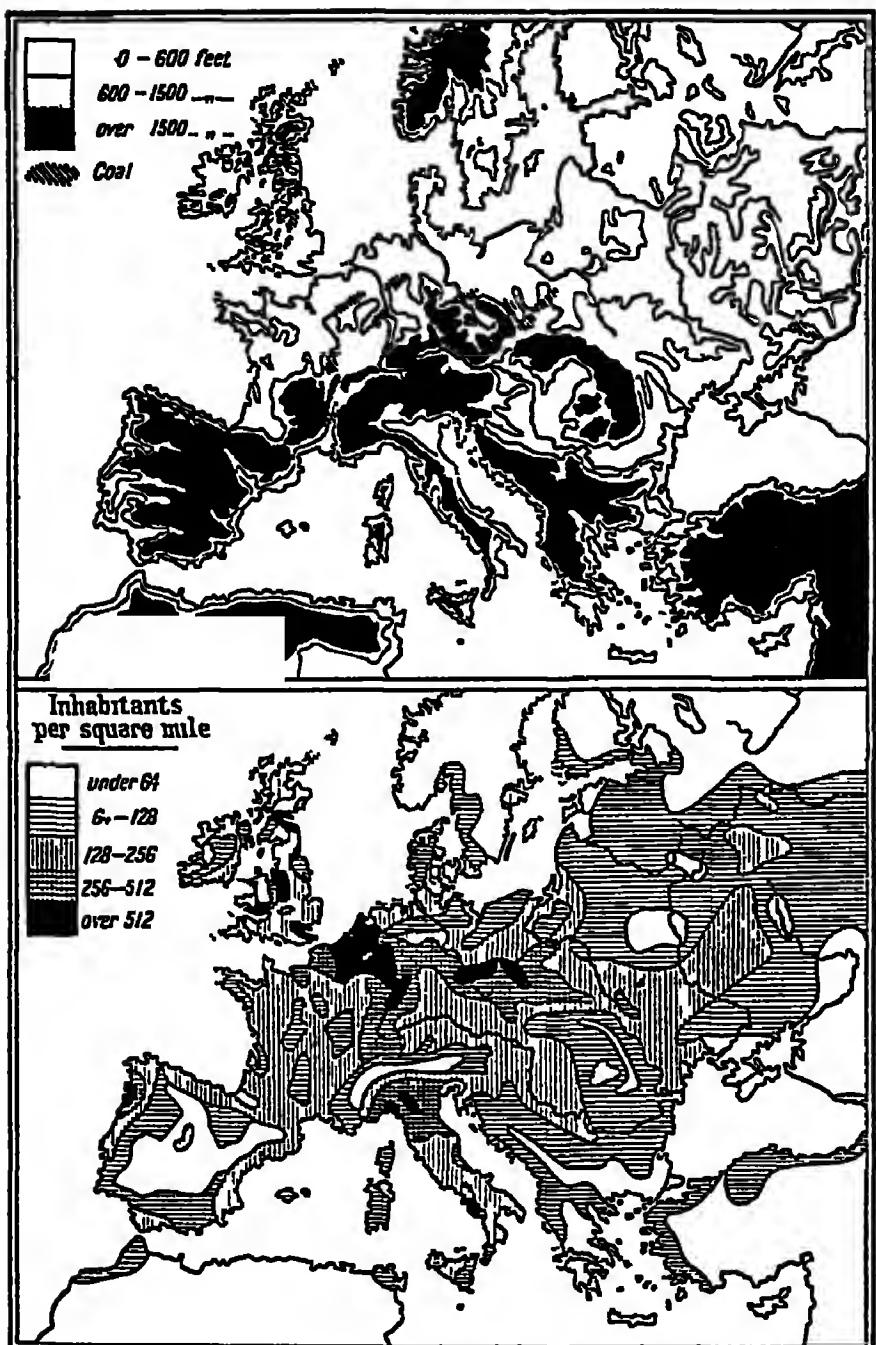


FIG. 83.—THE TOP MAP SHOWS THE POSITION OF THE COALFIELDS WITH REGARD TO THE HIGHLANDS. THE BOTTOM MAP SHOWS THE DISTRIBUTION OF THE POPULATION

Compare the two

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Cologne are important river ports. The Ruhr or Westphalian industrial region is the largest and most important on the Continent.

In a similar position are the German coalfields of Saxony and Silesia. In Saxony iron ore as well as tin, silver, and zinc are obtained in the Ore Mountains, but much iron ore has to be obtained from Lorraine or Sweden. Chemnitz is a large textile manufacturing centre; Dresden china is made at Meissen fourteen miles away, and both Dresden and Leipzig are fine cities, noted for their museums, art galleries, etc. Leipzig has great fairs which attract merchants from all parts of Europe and has also extensive printing and piano-making trades. In Silesia, Breslau and other towns manufacture woollen goods, and have to import raw wool from Argentina and other countries to supplement local supplies.

In Bohemia, the most important part of Czechoslovakia, coal and iron are mined near Pilsen and Prague and are largely used in brewing, sugar-refining, paper-making, leather manufacturing, and engineering, particularly the making of agricultural implements. These manufactures are related to home agriculture, forestry, and pastoral occupations. Most of the foreign trade is carried out by means of river transport on the Elbe and by railways along its valley.

If you have been following these industrial areas on the map, as you ought to have done, you must have realised the importance of such navigable rivers as the Rhine, Elbe, and Vistula, especially to an entirely inland country like Czechoslovakia. Since the Great War these and certain other rivers

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have been internationalised and made free for the use of all nations.

Poland has great mineral wealth of coal, iron, oil, and salt in the south-west on the borders of Silesia, and it has, therefore, every opportunity of developing into a strong State, provided the Poles prove equal to the task. Raw cotton is imported via the Vistula and sent to Lodz and Warsaw, both of which have growing iron and machinery, leather and textile industries. Near Cracow there are valuable deposits of salt and petroleum. Similar deposits of great value are also found in the foot-hills of the forest-clad Carpathians north-west of Bucharest, the capital of Rumania.

The principal Russian industrial area is found near Moscow, which has very important cotton, woollen, leather, china, and engineering industries, and is the largest Russian industrial centre. Tula, south of Moscow, has large iron and steel works. The coalfield in the Donetz area in the south has been mentioned already. All kinds of coal—anthracite, bituminous and lignite—are found, as well as an abundance of iron. A third coalfield lies on both sides of the Urals, and Perm and Ekaterinburg are the largest towns engaged in iron and steel trades, especially in the making of agricultural implements and railway stock. Russia, however, is still largely untouched by modern industrialism.

We have now noted the chief European industrial regions and have seen that they are associated with coal and other minerals, especially iron, found along the northern margins of the highlands of Central Europe. There are other manufacturing areas, e.g. the Saar basin and the French iron

manufacturing areas of St. Étienne and Le Cruzot, but there is no need to discuss them in detail here. We have also mentioned the industrial areas of Switzerland and Norway (see pp. 191, 194). As in Britain, so in France, Belgium, Germany, Bohemia, Poland, and Russia, the development of mineral wealth has led to a massing of people in crowded manufacturing cities and in most cases to a corresponding neglect of the country-side.

It has had other effects which have been felt throughout the world, and have again and again been the cause of international strife and jealousy. Ever since Europeans discovered the way to India and the Far East, the island continent of Australia, and the great American continents, and began to settle in some of those lands, there has been a steady, though small, emigration. In the middle and latter part of the nineteenth century there was a great increase in the number of emigrants, for by that time the industrial changes had taken hold and the large population of the manufacturing areas of Europe became more and more dependent upon the produce, both of food and raw material, of other lands. European emigrants working on the ranches, wheat fields, and farms of Canada, the United States, Argentina, South Africa, and Australia; in the forests of Canada; or in the superintendence, in tropical lands, of native tribesmen engaged in the production of jute, cotton, sugar, tea, coffee, rubber, palm-oil, and copra, not only made it possible for those at home to be supplied with food and raw material for manufacture, but became themselves markets for the finished products, and at the same time did something to help to transfer

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some of the people from the crowded parts of Europe to the empty spaces of the world.

In this manner the European countries have occupied and claimed for themselves large parts of all the other continents ; some have been more fortunate in this respect than others, and those who had taken up industrialism after most of the land had been parcelled out felt aggrieved. Industrialism brings power to a country, and with that power the desire to exercise it, and to possess sources of raw materials and markets for the finished articles. And this often brings strife, jealousy, and war , when, of course, it should lead to co-operation and exchange for the benefit of all.

EXERCISES

1 Find out something about the following weft, warp, spinning, weaving. Which is the biggest cotton spinning town in the world ?

2 Write a short account of a day in the life of a coal-miner.

3 Why are larger and more bulky articles made on the Tyneside coalfields than in the " Black Country " ?

4 Why was Holland a more important country in the Europe of the seventeenth century than she is to-day ? What legacies of her former greatness does she still possess ?

5 Compare an industrial region based on hydro-electric power with one dependent upon steam power.

6. Which European countries are likely to develop industries dependent upon water power ? Which are not ? Give reasons in both cases.

7. Where are the following towns ? For what industries is each noted ? Give reasons. Lille, Namur, Sheffield, Bolton, Dusseldorf, Breslau, Moscow, Lyons, Milan.

8 How have Czecho-Slovakia, Poland, Hungary, and Austria been helped by the internationalisation of certain European rivers ? .

CHAPTER XIV

THE INDUSTRIAL REGIONS OF NORTH AMERICA

IN the last chapter we saw how many crowded industrial regions have grown up around the coal-fields of Western and Central Europe. The same developments have taken place in North America, especially in the United States. Fig. 84 shows the distribution of the principal coalfields of that great country. They lie east of the meridian of 100° W., and the one which is at the present time of greatest importance is that lying to the west of the Appalachian ridges. The United States is also extremely rich in iron ore, which is chiefly obtained along the southern and western shores of Lake Superior and in the southern portion of the Appalachian coalfield. In the production of coal and iron the United States is the leading country in the world. Now the chief iron and steel manufacturing towns are found along the southern shores of Lakes Michigan and Erie, in the upper basin of the Ohio River in western Pennsylvania and West Virginia, and on the coalfield of the southern Appalachians. If you have read the last three sentences carefully you will have noticed that in one region we find iron and steel manufactured where neither iron nor coal is produced locally, in another where coal and not iron is found, and in a third where both

iron and coal are present. In all three the limestone, so necessary in the smelting of iron ore which requires the help of a flux to produce an easily-flowing liquid slag, is easily obtained.

The first of these areas to be developed was the one in the upper basin of the Ohio. Here the dominating town is Pittsburg, where iron and steel trades are specialised in just as they are in and round Sheffield or Birmingham in England. Very little iron ore is mined in this region, because local supplies have been practically exhausted. In order to keep the iron and steel mills going the ore is brought by boat from the Lake Superior iron mines to ports like Cleveland on Lake Erie. From there it is carried to the Pittsburg district by canal or rail. Most of the steel trade of Pittsburg is in the hands of a great Trust or "combine" of companies, which owns not only the steel-making plant itself, but mines, lake steamers, and wharves.

The Pittsburg district has also rich deposits of petroleum, oil, and natural gas, commodities of great importance as additional sources of power. The first-named is used all over the world, from the frozen Arctic to the tropical lands of the Congo or Amazon. Think of the wide range of products obtained from crude petroleum; here are some: naphtha, petrol, kerosene, lubricating oil, paraffin, vaseline, and asphalt, whilst it is also used in making aniline dyes, the insulation of electric wires, india-rubber solutions, and in medicines. Natural gas is used for street and house lighting, and also as fuel, especially in the local glass works.

The Pittsburg area is a busy industrial region

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of crowded towns, producing far more goods of iron and steel than are required for its own people or even for those of the United States. It therefore exports its surplus products to foreign countries through the ports of New York, Philadelphia, and

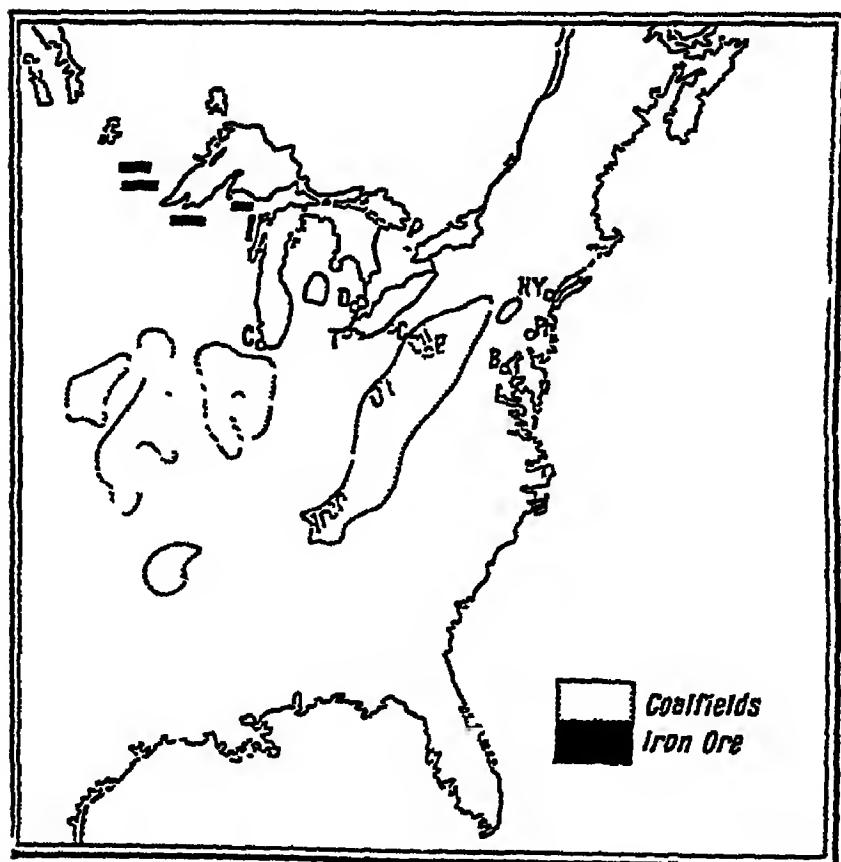


FIG. 84.—THE COAL AND IRON FIELDS OF EASTERN UNITED STATES
Compare with Fig. 85 opposite.

Baltimore, to which it is connected by railways. These ports are also themselves great manufacturing towns. New York, which is far and away the largest and most important port and commercial centre of the country, owes its supremacy to its comparatively easy access to the central lowlands by way of the valleys of the

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Hudson and its tributary the Mohawk. These valleys give the easiest route across the Appalachian barrier. It manufactures iron goods and clothing. Philadelphia is near to coal and iron, and is a great engineering town as well as a port. The making of ships, locomotives, and machinery

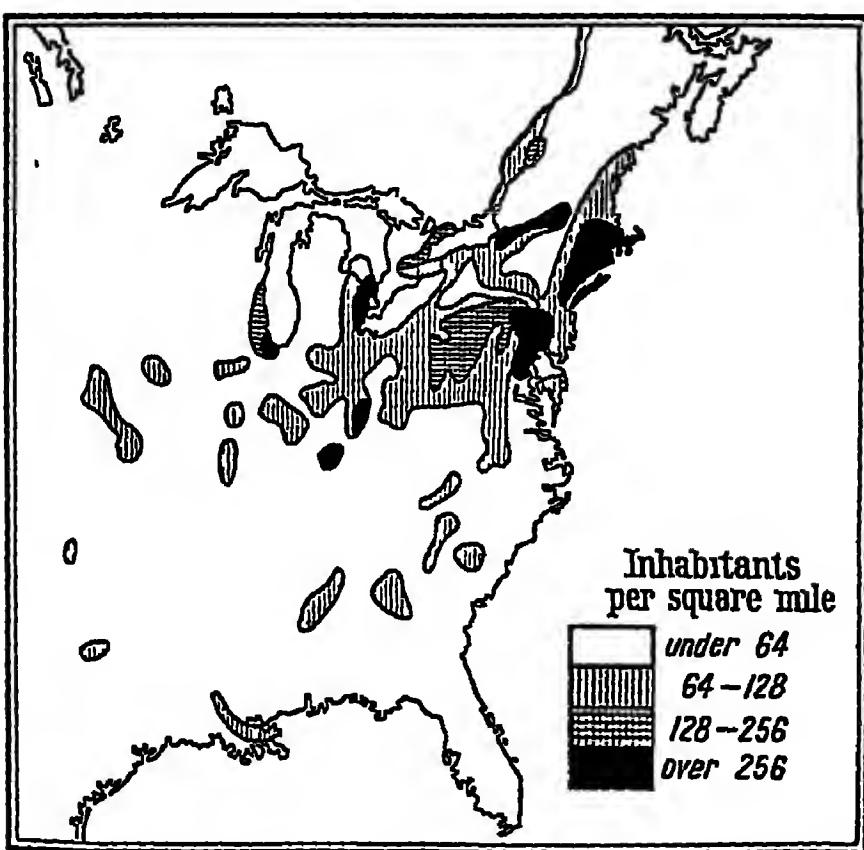


FIG 85.—POPULATION MAP OF EASTERN UNITED STATES

Compare with Fig 84 opposite

occupies many thousands of its inhabitants. Baltimore is also near to supplies of coal and iron, while its more southerly position brings it near the tobacco and cotton fields, so that it has growing manufactures of these articles.

The southern Appalachian industrial region is

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one of more recent development than the Pittsburg region. Its chief town is Birmingham, whose main industry is the manufacture of iron and steel goods. But Birmingham

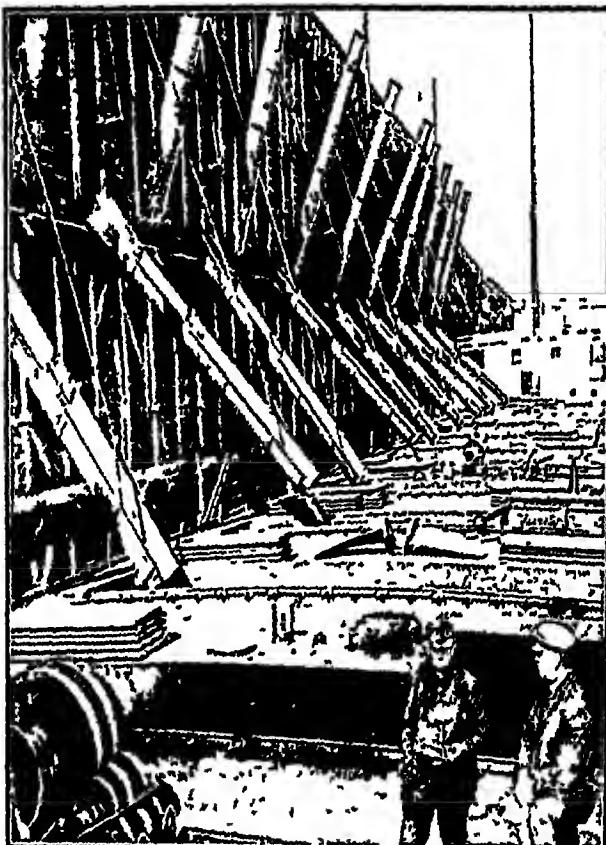


Photo by Underwood Press Service

FIG. 86.—PHOTOGRAPH OF ONE OF THE LARGE STEAM BARGES LYING ALONGSIDE A LAKE SUPERIOR IRON-ORE WHARF

The ore in the bunkers above comes down the chutes into the barge

and scores of other towns in this part of the country are now manufacturing cotton goods, for they are situated within the cotton-growing belt. Many of these towns are old, small "fall-line" manufacturing centres now being

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revived or increased in importance by the development of the southern Appalachian coal and iron fields. They extend as far north as Richmond, the

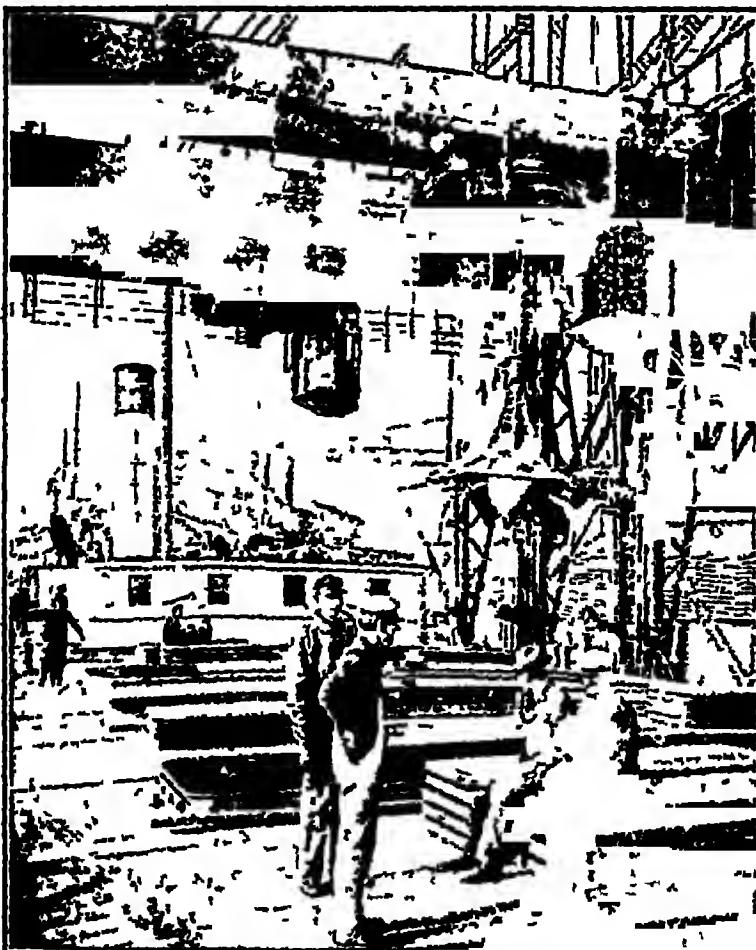


Photo by Underwood Press Service

FIG. 87.—IN THIS PICTURE THE STEAM BARGE HAS ARRIVED AT CLEVELAND, WHERE THE GREAT IRON "HANDS" SOON TAKE THE ORE OUT OF THE BARGE AND DUMP IT INTO RAILWAY TRUCKS OR CANAL BARGES

Work has been suspended on the barge in the foreground, but it is proceeding on the one farther away

famous Virginian tobacco town, and are all placed on rivers where the latter form falls on leaving the older, harder rock of the Appalachian highlands for the newer, softer measures of the coastal plains.

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The line joining these places is the "fall-line." You will understand this better if you draw the map suggested in Exercise 4 on page 243.

The third great iron and steel manufacturing region lies along the southern shores of Lakes Michigan and Erie, and obtains its iron from the shores of Lake Superior and its coal from the Appalachian coalfield. Fig. 85 shows both deposits. The Lake Superior mines are the world's greatest source of iron ore. The ore comes to the surface so that it is quarried in the open air, whilst there are even hill ridges of valuable iron deposits. It is obtained on a tremendous scale and in such an economical manner that it has enabled the smelting to take place where the ore meets the coal, i.e. at Chicago, Detroit, Toledo, Cleveland, and many other places. Water transport is very cheap and the ore is "handled" as economically as possible. It is taken out of the quarry or pit by steam-shovels, which dump it into waiting trucks. In these the ore is conveyed on a down-grade railway to the nearest shipping-port on the lake. There it is discharged automatically into huge bunkers built by the lake side, and from there it slides down chutes into the holds of the steam-barges. A single truck only takes a few seconds to unload; a 6,000-ton barge is loaded in less than two hours.

What is done with all this ore when it reaches the towns mentioned above? At Chicago, a great city of nearly three million inhabitants situated on Lake Michigan, where the great waterway of the Lakes and the St Lawrence penetrates farthest into central United States, iron and steel rails and locomotives are made for many of the forty different

railways entering the city. It is a most important railway terminus as well as being on some of the lines which cross the continent from east to west. Millions of "tin" cans and a great deal of machinery and equipment are also required for the canning trade. Chicago is the chief slaughtering and canning city for the stock-rearing prairies of Western U.S.A. It is said that over one hundred and fifty thousand cattle, sheep, and pigs are slaughtered daily. Besides beef, mutton, and pork products, the fat is made into lard and margarine, the bones into buttons and manures, the horns and hoofs into combs, and the hides into leather. At Detroit, on the river between Lakes Huron and Erie, there are the world-famed Ford motor works. Detroit has grown so rapidly that its population now exceeds one million, and it is the fourth largest city in the country. At Toledo, Cleveland, Buffalo, and other ports on Lake Erie there are great iron and steel works, and machinery and steamships are built.

St Louis, Cincinnati, Omaha, Kansas City, and many other cities in the prairie stock-rearing and corn-growing belts have followed the example of Chicago and have added iron and steel industries to their canning and packing trades.

So far the industries we have considered have been largely related to the getting of coal and the smelting and manufacture of iron. The chief textile manufacturing region, and the one which for a long time was the principal region for the manufacture of iron and steel goods, is that of the New England States of Massachusetts, Connecticut, and Rhode Island. This is remarkable, because the northern Appalachians, of which New England

is a part, have neither coal nor iron ; nor can they produce enough wool and skins for their woollen and leather industries, while they cannot grow cotton at all, and are compelled to obtain this from the Southern States. The reason is that it was in New England where the Pilgrim Fathers settled, and it was then that their descendants, long before the days of steam, utilised the great resources of power which they found in the many waterfalls. The skill of the inhabitants in manufacturing cotton and wool has enabled them to maintain their industries, even in the face of competition from Baltimore and from the cities of the "fall-line" and the southern Appalachian coalfield, though the latter are near the cotton-growing region, and also possess supplies of coal and iron. Manchester, Lowell, and Fall River are only three of the textile manufacturing towns situated near falls or rapids on rivers.

New England is also world-famed for watches and clocks (made at Waterbury and Waltham) ; for firearms and small ammunition, for machine tools, jewellery, and a great variety of small metal goods requiring skill and intellectual training on the part of the worker, but the importation of a limited amount of raw material. In this respect New England resembles Switzerland. Boston, with a magnificent harbour formed at the meeting-place of several drowned river valleys, is the collecting centre of goods for export, and the receiving and distributing centre of the raw materials imported by sea. A great deal of coal is imported from Pennsylvania, for in modern times the water power is quite inadequate. Some of the coal is

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used for steam-driven machinery, some for driving machinery which generates electricity.

There is a most interesting scheme, which is expected to be in full operation by 1930, by means of which there is to be co-operation between the steam-electric and hydro-electric plants. At present there are 96,000 industrial plants working, and it is proposed to reduce them to 273 super-power stations from which electric power will be distributed to the factories of the surrounding area. Over half of the railway mileage will be electrified, and it is estimated there will be an annual saving of nearly 50,000,000 tons of coal. More important still, the manufacturing cities will be cleaner, for a good deal of the smoke nuisance will be eliminated. It will also make it possible to space out the industrial establishments, instead of crowding them together.

The Niagara Falls district, which lies partly in Canada and partly in the United States, is one of the world's greatest centres of electrical energy. The amount of water which can be diverted from the river above the Falls, and led down great pipes to power stations situated at the level of the bottom of the Falls, is regulated by treaty. By means of this diversion the water is given a "head" of about 300 ft., and its great force at the power-houses drives turbine engines. The power works already established near Niagara develop 4,000,000 horse power per annum, and supply electric power which is used as far away as Buffalo, as well as in the works which have naturally grown up in the immediate vicinity.

Now let us recapitulate the four principal

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industrial regions of North America. They are: (i) the Pittsburg area of the upper Ohio basin; (ii) the southern Appalachian coalfield; (iii) the belt along the southern shores of the Great Lakes; and (iv) the manufacturing areas



Photo by Canadian Pacific Railway

FIG. 88.—A GENERAL VIEW OF THE NIAGARA FALLS

On the left are the American Falls, and on the right the Canadian or Horseshoe Falls. Goat Island is between these two falls. The building indicated by the white cross is a hydro-electric power house. Water is led off from the river above the falls and rushes to the power house down great pipes which go through the rock.

of New England. All four are in the United States. Canada has a considerable amount of coal and iron, but at present she has no great industrial areas to compare with those of her southern neighbour, and iron, steel, and coke, with manufactured cotton and woollen goods, form her chief imports. Most of the big towns have growing industries, and in places like Toronto and Winnipeg

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large quantities of machinery, especially for use in agriculture, are manufactured. There are small but important coalfields in Cape Breton Island and the adjoining portion of Nova Scotia, where local and Newfoundland iron ore is smelted, and in the

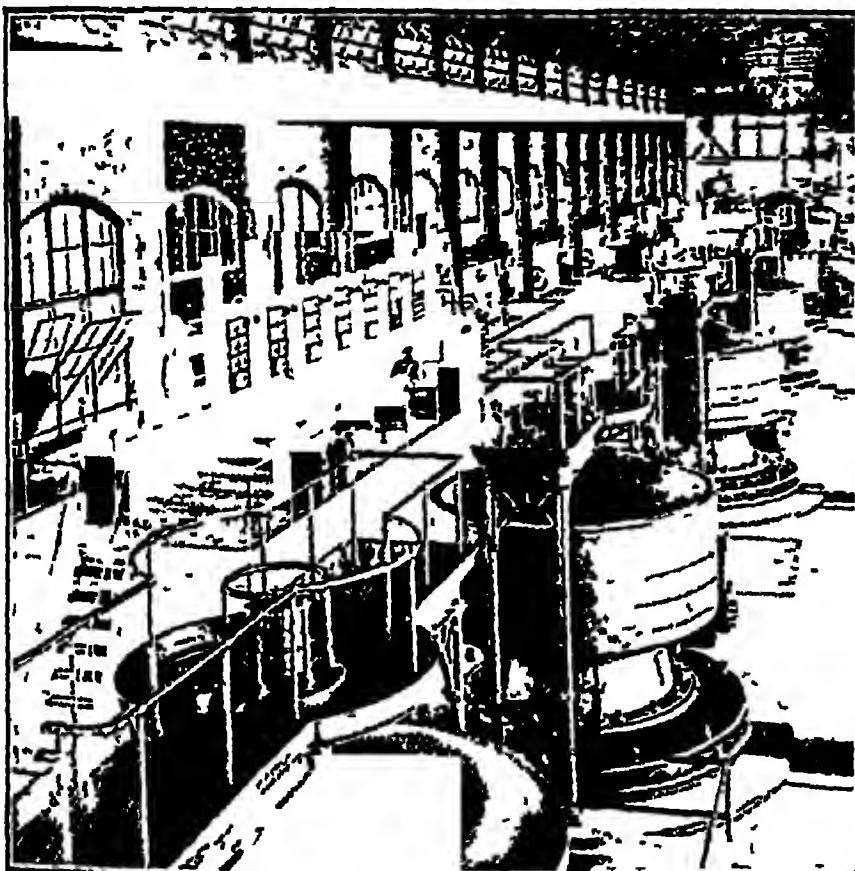


Photo by Underwood Press Service

FIG. 89.—THIS IS AN INSIDE VIEW OF THE POWER HOUSE SHOWN ON FIG. 88

Each of the dynamos is of 5,000 horse-power

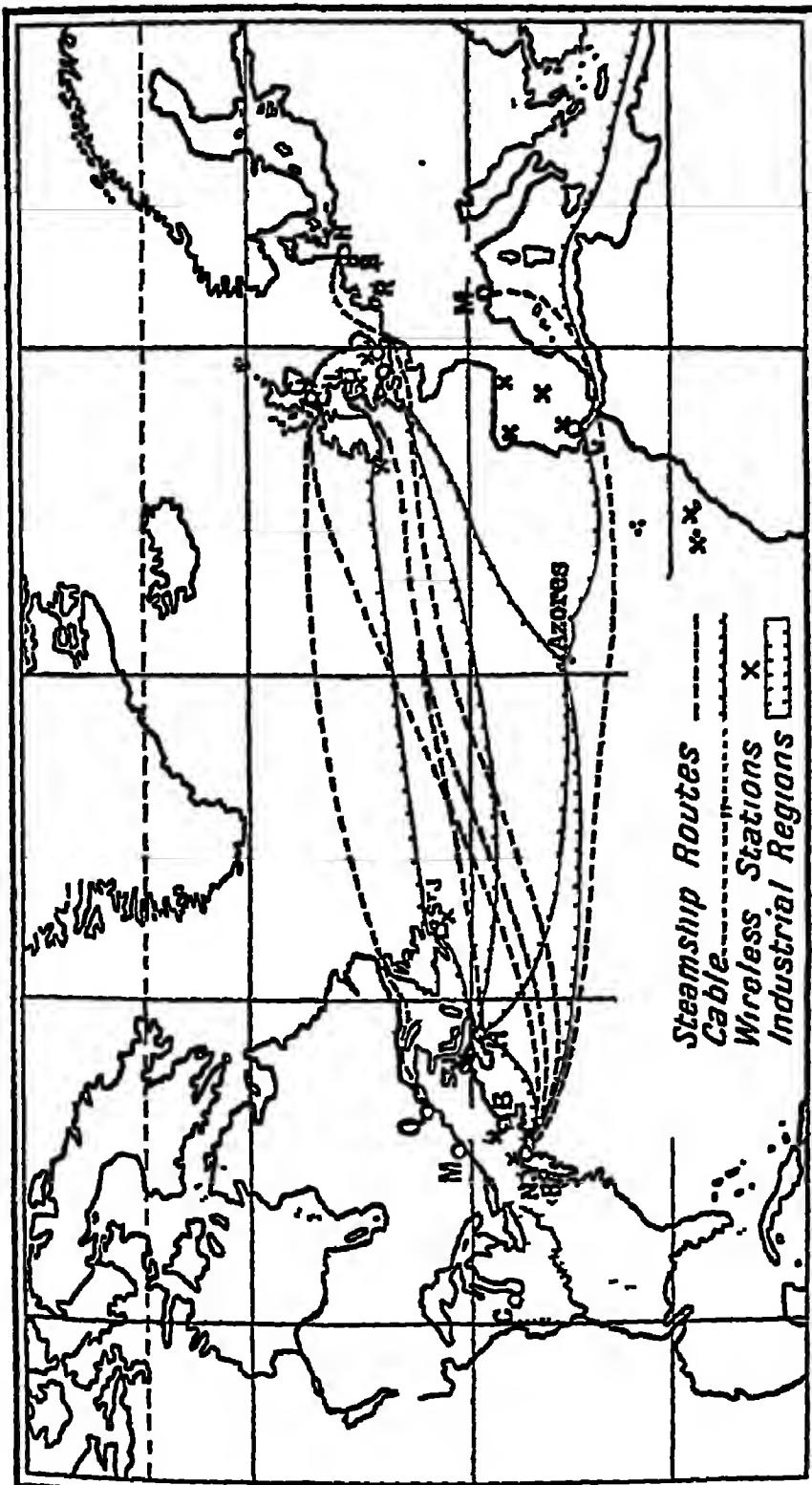
island of Vancouver on the opposite side of the continent. The coal from these two fields is of great importance for the railways and steamships.

We have now learned a little about the world's two greatest industrial zones, the European and the North American. These regions are fed by a network of railways and roads, and by many canals

or great river and lake waterways. Not only has each smaller unit means of transport which bind it together and link it with other units, but they are connected with ports through which they do their trade. They are great producers of all kinds of manufactured articles and are dependent upon other regions, sometimes in other continents, for the greater portion of their food supplies. How much an industrial region is dependent upon other regions can be seen if for a moment we imagine what would happen if the railway and motor transport services ceased work for even such a short time as a fortnight.

Here, then, on either side of the North Atlantic are the world's greatest industrial populations and the world's greatest ports. Is it to be wondered that between them we find the world's greatest ocean highway, a highway used by such a large number of steamships of all kinds, and so crowded that there are recognised "lanes" for ships crossing in either direction? By keeping to the "lanes" the danger of collision is lessened, whilst another advantage is that the slower-moving sailing ships can avoid the "lanes." A journey to America in the old days was a most formidable undertaking. The *Mayflower* took sixty-four days, and that time was not appreciably reduced at the time of the loss of the American colonies. To-day a big modern steamer does the journey in less than a week—the fastest take under five days—so that it is quite common for business men to make the trip across the "herring pond," as some Americans have designated it. Cables have been laid on the bed of the ocean and messages can be sent from one continent

FIG. 90.—MAP SHOWING THE GREAT WORLD TRADE FOCUS OF THE NORTH ATLANTIC.



to the other in a short space of time, whilst " wireless " stations flash business messages, concerts, and lectures from one side of the ocean to the other.

Across the North Atlantic Ocean there is a great movement of passengers, mails, and goods in both directions. Lancashire cottons ; Yorkshire and French woollens ; French, Italian, and German silks ; Irish, French, and Belgian linens ; Birmingham, Belgian, and Ruhr machinery ; French and Italian motor-cars ; Parisian articles of fashion and art, e.g. jewellery, millinery, gloves, etc. ; Mediterranean fruits and wines, the latter for Canada only, for the United States have adopted " Prohibition " ; Swiss clocks and watches, are all exported from the appropriate ports on the European side. Of these the chief are Liverpool, London, Hamburg, Bremen, Rotterdam, Antwerp, and Le Havre. Of course, not all the articles carried from Europe to North America originate in the industrial regions. Most of them do. They are not all destined solely for the industrial regions on the other side of the water, although again the greater number are, for many buyers are found there.

Perhaps the chief export from Europe to North America is men and women. Millions of Europeans have emigrated to Canada and the United States. The United States now regulates the number which can be received each year from the different countries, and does not admit all who wish to enter. In times of unemployment she exercises the right of suspending immigration altogether. Britons who wish to seek their fortunes

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in North America are more fortunate than the others, for they can go either to the great British Dominion of Canada or to Newfoundland. Even in the United States they are at an advantage, for it is an English-speaking country, and began its history as a British Colony

When we come to the commodities carried from Montreal, Boston, New York, Philadelphia, and other American ports to Europe, we find that the chief articles are foodstuffs (meat, wheat, flour, etc.), and items coming under this heading are recognised as products of the prairies, although the meat will have been largely canned and packed at Chicago and the cities previously mentioned as engaging in this trade. Then come raw cotton for the mills of Lancashire, Rouen, Ghent, and the Ruhr towns; manufactured cotton goods; manufactured iron and steel goods; machines, tools, and motor-cars; petroleum oil and its products; leather goods and tobacco.

Most of these are products of the industrial regions, and they find a market in most of the countries of Europe, even in those possessing industrial regions making the same articles, or at least articles coming under the same general heading. They are perhaps either different in quality or of a character unlike those imported, e.g. the specialised goods of New England and special kinds of American motors, agricultural implements, or household utensils. Nevertheless, it is clear that in the case of many regions there is a great deal of similarity and therefore competition between home products and those of outside countries. That is why most countries attempt to support

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home industries by placing heavy duties on imported articles which can be produced at home.

Finally, it should be clear that modern trade and commerce are not a simple process of buying and selling, of transport and distribution, but complicated systems of tariffs, banking, exchange, insurance, etc., employing hundreds of thousands of clerks, bankers, experts, customs officers, lawyers, etc., and requiring great commercial centres like London and New York in which all these can meet and transact business. All these people and their families—and the same is true of the actual miners, mill-operatives, and factory workers of the industrial centres—need homes, food, clothing, recreation, and entertainment. Therefore, we have all kinds of shopkeepers and retail distributors ; as well as municipal workers in offices, water-works, transport services, museums, libraries, public parks, sanitary and medical services. In this way we get the great commercial and manufacturing towns of the industrial regions, and the closeness of these towns leads to that concentration of population which we associate with such regions.

EXERCISES

- 1 Find out how petroleum and natural gas are formed, and how they are obtained.
2. Make a list of all the things made of iron and steel which were used in the construction and equipment of your school. Do you know where they came from ?
3. You must have noticed the number of North American place-names beginning with " New," e.g. New Hampshire.

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Make a list of them and, if possible, say why each received its name.

4 On an outline map of Eastern United States insert the following rivers and towns (the towns are in brackets). Alabama (Montgomery), Savannah (Augusta); Santee (Columbia), Neuse (Raleigh), James (Richmond), Potomac (Washington); Schuylkill (Philadelphia), Delaware (Trenton). Draw a line joining up the towns. What name can be given to this line? Why?

5 In 1840 there were 4,470 people in Chicago. In 1890 there were 1,099,850, and in 1920, 2,701,705. Find out the reason for this tremendous increase.

6 How many miles is it from Liverpool to New York? How long does it take on (a) a fast passenger and mail boat, (b) a cargo boat? If you went from Liverpool to New York and did not alter your watch whilst at sea, how many hours would your watch be "wrong" when you got to New York? Would it be "fast" or "slow"?

7. The following instruction is frequently seen in the pilot house of a vessel. Find out what it means:

"Green to green, and red to red—
Perfect safety, go ahead."

8 A recently built cargo boat was designed to carry a load of 30,000 tons. How many trains of forty trucks, each holding 30,000 pounds, are required to transport her cargo?

CHAPTER XV

THE REGIONS OF THE EMPIRE

We have now surveyed the principal types of regions found on the earth. Before we finish our study two further tasks lie before us. First we shall survey briefly the regions of our far-flung Empire. Then in the next and final chapter we shall consider the world as a living unit in itself.

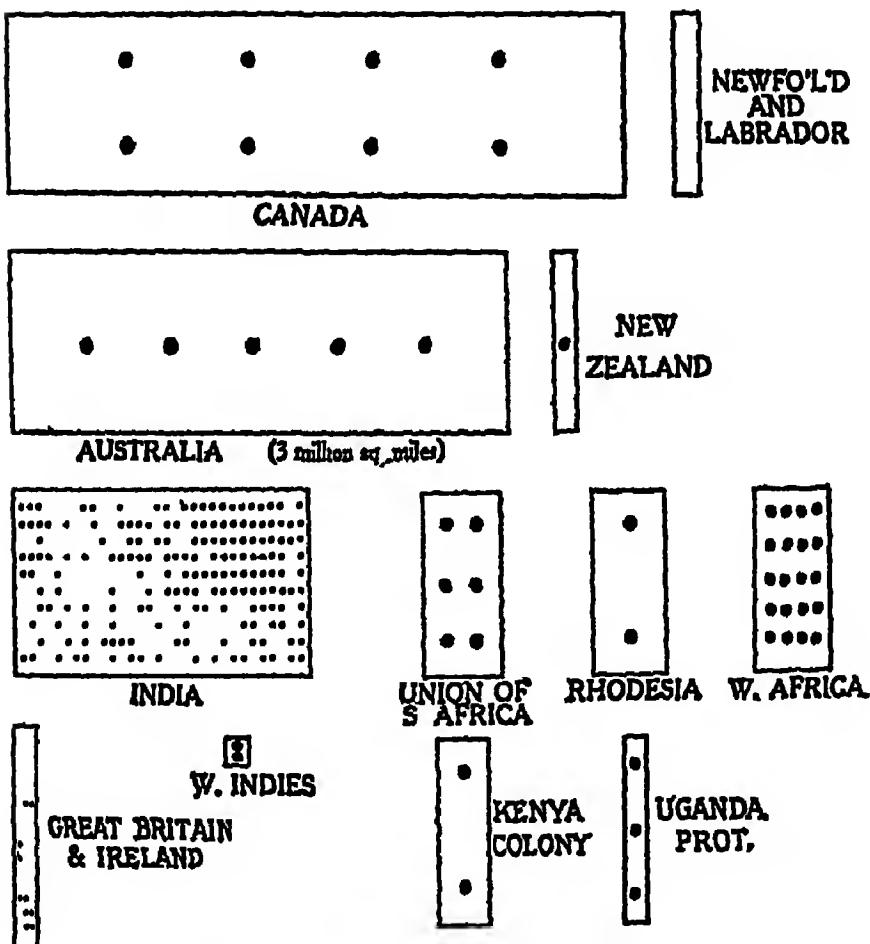
The British Empire contains about a quarter of the land surface of the globe and is inhabited by about a quarter of the people of the world. "It consists of many isolated territories of all shapes and sizes, varying from the three and three-quarter million square miles of Canada to the two square miles of Gibraltar. It is scattered all over the globe, from the Arctic to the Antarctic and from farthest east to farthest west. There are thus found within it every type of scenery, from the snow-capped peaks of the Himalaya to the sun-baked plains of Australia ; every type of climate, from the hot and steamy Gold Coast to the biting cold of northern Canada ; every type of plant, from the lichen of the mountain top and tundra to the enormous Douglas firs of Vancouver ; every useful animal and mineral and every type of humanity, from the

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degraded cannibals of Borneo to the highest types of modern civilisation."¹

Such an Empire, the most extensive the world has

RELATIVE AREA AND POPULATION OF PARTS OF THE EMPIRE



Each dot represents 1,000,000 people

FIG. 91.—THIS DIAGRAM SHOWS THE RELATIVE AREA AND POPULATION OF PARTS OF THE EMPIRE

ever known, has been built up since the days of the great discoveries of Vasco da Gama, Christopher

¹ From *The Economic Geography of the British Empire* (Thurston). University of London Press, Ltd.

Columbus, Amerigo Vespucci, Ferdinand Magellan, the Cabots, and many other explorers of the Age of Discovery. Their discoveries entirely altered the importance of the position of the British Isles, for instead of being on the outskirts of Europe, removed from the commercial centres of the Mediterranean, Britain found herself in a central position in the world, in a fine position for trading with the new lands. In the days of Elizabeth the supremacy of the sea passed from Spain to Britain, and it was the work of such Elizabethan sailors as Drake, Raleigh, Hawkins, Frobisher, and the rest which laid the foundations of our Empire. The fascinating story of Empire expansion should be read elsewhere. Here it is sufficient to say that since the glorious days of Elizabeth the Empire has been extended sometimes by conquest from other countries, especially from the Spanish, the French, and the Dutch, sometimes by purchase, sometimes by settlement, and sometimes, especially in tropical areas, by the extension of British "protection" over native states.

Trade was the great motive of the first Empire-builders, and as trade is better carried out by private enterprise than by governments, the Empire owes a great deal to the work of such companies as the Levant Company, the Hudson Bay Company, the East India Company, the Royal Niger Company, and the British South Africa Chartered Company. Later another motive appeared. It became necessary to find new lands where British settlers could live, lands that could not only relieve the pressure of the population at home, but could produce food and other supplies for the mother country. Then

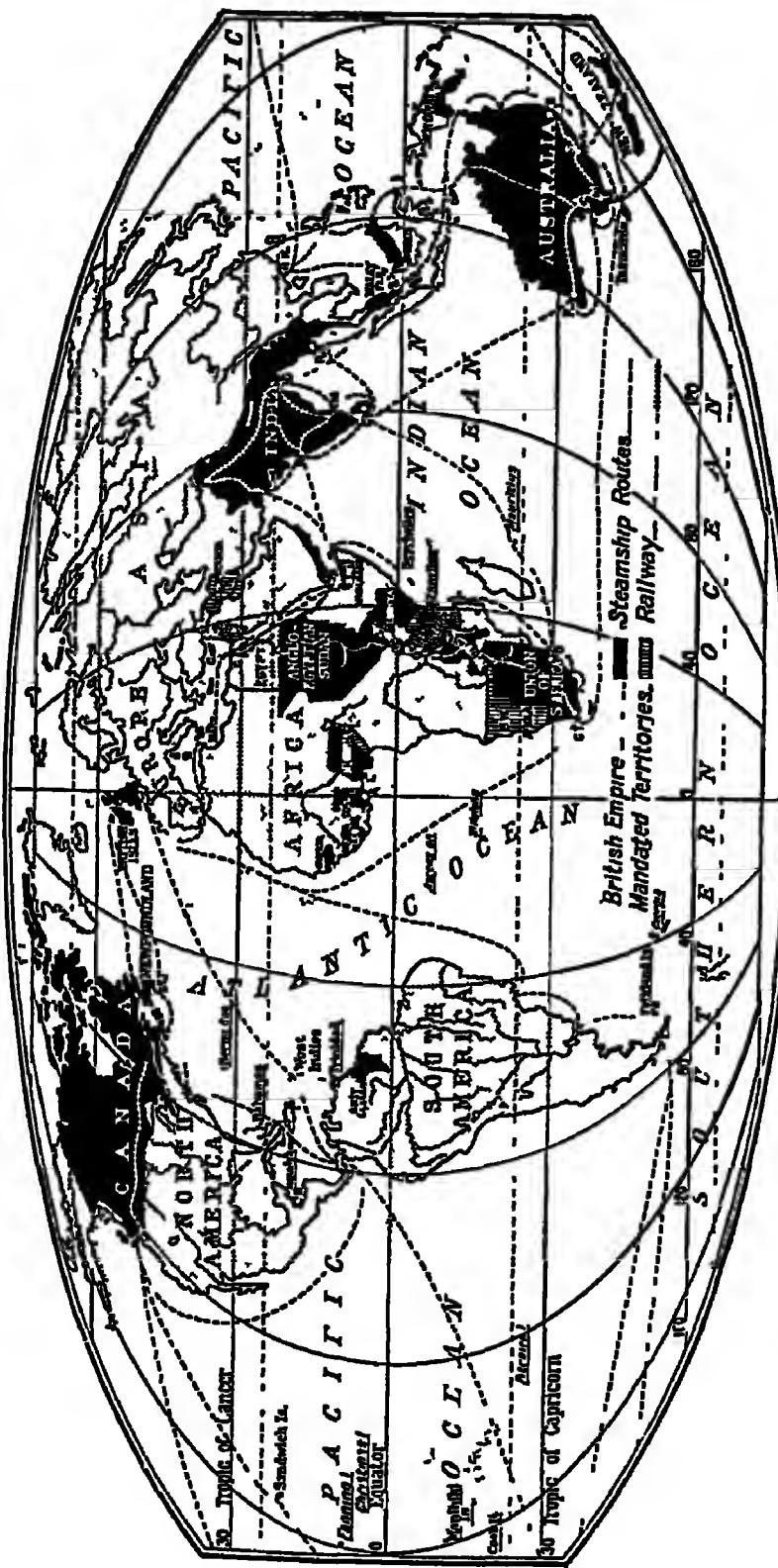


FIG. 92—THE BRITISH EMPIRE AND ITS PRINCIPAL MEANS OF COMMUNICATION

the empty spaces of lands like Canada, Australia, and South Africa were occupied. So through the fortitude, endurance, bravery, and even the sufferings and hardships of our ancestors, the Empire as we know it to-day has been built up. Since the Great European War some of the former German possessions have been placed by the League of Nations in the charge of the British Empire or of countries contained in the Empire. Such mandated lands are indicated in Fig. 92.

Let us now survey very briefly the Empire as it is to-day, particularly from the point of view of the natural regions found within its borders. As we have already seen, we shall find that every type of region and product is represented. We shall take the regions in the order of their treatment in this book.

In the north of Canada, both on the mainland and in the island archipelago off its northern shores, we have the lonely "Barrens" inhabited by scattered tribes of Eskimos. They produce very little of value, although in Chapter III we learned that in the opinion of a famous explorer and geographer, Stefansson, they have considerable possibilities in the production of meat and hides (see page 46). At present they are lands of the "lone north."

Empire forests of the temperate type are best seen in the great forest belt stretching across Canada south of the Barrens. Hunting and trapping are carried on in the Hudson Bay area, and thousands of furs are despatched to Europe and the United States. In British Columbia and in the basin of the St. Lawrence, lumbering, paper-manufacturing from wood pulp, and the manu-

facture of all kinds of articles made of wood are important occupations. In Eastern Canada, where the earliest Canadian settlements were located, mixed farming is extensively carried on in areas cleared of forest, and large quantities of dairy produce, particularly cheese, are exported.

Eastern and south-western Australia, Tasmania, and both islands of New Zealand have great areas of virgin forest. Karri and jarrah wood is exported from West Australia, and kauri pine and kauri gum from New Zealand. It is unfortunate that Canada, Australia, and New Zealand are so far from the mother country, and it is on that account that the nearer, and therefore cheaper, supplies from Norway and Sweden are chiefly imported for use in the pits and various construction works, e.g. the building trades, of Britain.

The Empire is exceedingly rich in temperate grasslands, and therefore in supplies of temperate cereals, such as wheat, barley, and oats ; of cattle, horses, and sheep, and therefore of meat, hides and skins, and wool. The Canadian prairies, where Winnipeg is one of the chief grain markets in the world ; the South African Karroos and Veld, which export their wool largely through Port Elizabeth and East London, the grasslands of south-eastern Australia, whose wool, meat, and grain are exported from Sydney, Melbourne, and Adelaide, and the Canterbury Plains of South Island in New Zealand, from which Lyttelton exports wool and mutton, are all within the Empire. This is particularly fortunate for the Yorkshire woollen trade, and for a mother-land whose wheat output is totally insufficient to meet

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home needs. It is very largely to these Empire grasslands that the majority of the emigrants are going, or should go.

At first sight it appears extraordinary that meat should be sent from Australia and New Zealand to Britain. It is the introduction of refrigerating processes, both on land and on the steamships, which have made this possible. Without such aid it would be impossible to bring meat through the tropical regions, and to deliver it fit for food in shops on the other side of the world. What is possible for beef and mutton is, of course, also possible for dairy produce.

Empire "Mediterranean" lands are found in the southern hemisphere, in the Cape Town district of South Africa, the Perth district of West Australia, and in parts of the lower basin of the Murray-Darling. We have also learned (see page 178) that North Island in New Zealand has a modified climate of this type.

These lands of very warm dry summers and winter rains produce fruits, especially grapes, and wheat, but their dry pastures are, as a rule, only suitable for sheep and goats. Cyprus, Malta, and Gibraltar also belong to this type of region, though these are more important as "stations" on the great seaway from Britain to India and Australia via the Suez Canal.

Now we come to hot desert lands, and we find representatives of this type of region in north-west India, in south-west Africa, and in Western Australia. The greater part of the Kalahari Desert in south-west Africa is included in the ex-German territory mandated to the Union of South

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Africa. These lands are largely waste and barren, yet white men have made homes in two of them—the Kalahari and the Australian deserts—because of the lure of gold and diamonds

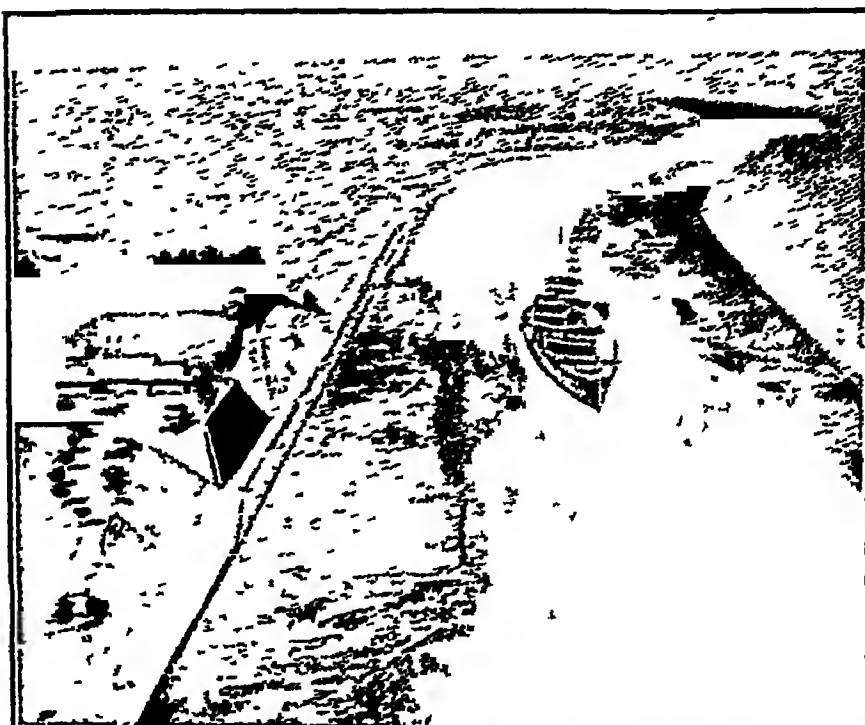
Equatorial forests are found on the coastal belts of Honduras and Guiana in America ; Gambia, Sierra Leone, Gold Coast, Nigeria, Uganda, Kenya, as well as in the mandated territories of Togoland, Cameroons, and Tanganyika Territory in Africa , and in Ceylon and the British parts of Borneo and New Guinea The late German lands of New Guinea have been placed in charge of Australia. Many of these areas are very backward and little development has taken place, but some, or all of them, either do or can produce cocoa, rubber, coconut and oil palms, spices of various kinds, as well as bananas and other tropical fruits.

Ceylon is the most advanced member of this group. Tea is her principal export, and rice is also extensively grown for food. Rubber has been introduced from Brazil, and in normal times of good trade in the rubber market Ceylon exports large quantities. Colombo is the capital and chief port. It is a great meeting-place of routes from the Suez Canal, the ports of India, Singapore and the Far East, Australia, Cape Town, and the ports of East Africa, and on that account has extensive coal wharves. On the west coast of Africa, Freetown, Secondee, Accra, Lagos, and Port Harcourt are noted ports.

Savannahs and tropical grasslands are found within the Empire in the hinterland of all the African territories mentioned above, as well as in Anglo-Egyptian Sudan and in Rhodesia. They are

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also present in the drier parts of India and in northern and north-eastern Australia. The wetter parts, the areas nearest the wetter forests, are agricultural lands which can produce cotton, maize, indigo, millet, beans, and yams. In the African areas there is a large negro population engaged in



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FIG. 93.—AIR PHOTOGRAPH OF THE BATTLESHIP "RENNOWN" OFF THE SUEZ CANAL HOSPITAL NEAR THE ENTRANCE TO LAKE TIMSAH, THROUGH WHICH THE CANAL PASSES

When the photograph was taken the *Renown*, carrying the Prince of Wales, was on an Empire tour. Notice the character of the land through which the canal is cut

agricultural pursuits. In the drier savannahs, towards the deserts, cattle rearing is the chief occupation. Here are found the more restless and migratory African tribes.

These tropical grasslands are looked to as the future source from which the Lancashire cotton mills will draw a large proportion of their raw

material. Experiments in Empire cotton-growing are being made in different places, and the prospect is hopeful.

This brings us to the monsoon lands, of which

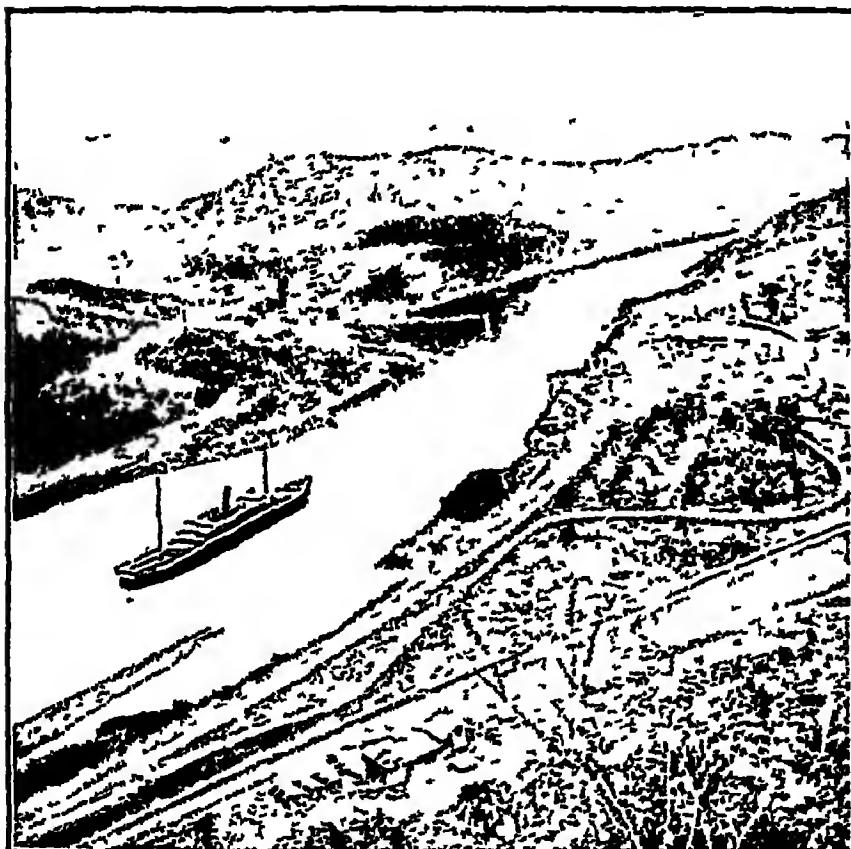


FIG. 94.—HERE WE SEE A STEAMER PASSING THROUGH THE CULEBRA CUT OF THE PANAMA CANAL

This was the most difficult part of the canal to construct. Why? Compare this view with that on the opposite page. Through the Suez and Panama Canals pass many of the most important Empire and world steamship routes.

India is the outstanding example. Three-quarters of the people of the Empire live in India, yet the Britishers in India form a mere handful of administrative officials, civil servants, missionaries, teachers, merchants, factory managers, and soldiers. The coastal belt of northern and north-

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east Australia is of the same type, but is largely undeveloped and may remain so, for it has not yet been proved that white people can undertake manual work in a tropical climate. The Australian government has adopted what is known as the "White Australia Policy," by which the admission of immigrants is restricted to "white" people. The British West Indies also belong to this type of region.

We have seen that India, in common with other hot monsoon lands, has a wide range of agricultural products due to the coincidence of great heat and moisture in the summer season, and also to the occurrence of two marked seasons, the hot and wet and the relatively cool and dry, each with its own cultivations. Rice, cotton, tea, sugar, indigo, jute, oil-seeds, millet, and wheat are characteristic products. The millet and rice are largely grown in India for home consumption, but large quantities of Burmese rice and of many of the other products are exported to Europe.

Bombay, Madras, Calcutta, Delhi, and Rangoon are the great cities of India and Burma.

Many of the Pacific Isles, both "high" and "low," form part of the Empire. The isolated island of Nauru, believed to contain the richest phosphate deposits in the world, two islands of the Solomon group, and part of the Samoan group were formerly German, and are now mandated to the British Empire, Australia, and New Zealand respectively. You must consult your atlas to find out which of the remainder are British. At the same time you can find out which are "high" and which "low" islands, and by so

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doing you can determine their products. Note that New Caledonia belongs jointly to Britain and France.

Lastly we come to the Industrial Regions, and we see at once that all the chief of these are in the British Isles themselves. We have also learned that it was the need of finding sources which could supply the raw material for these industrial regions, and could become markets for the finished articles, that provided one of the motives which built up the Empire. Canada, South Africa, Australia, and New Zealand are places where Britishers and their families can find new homes, but in the equatorial and tropical lands white men are birds of passage, and perhaps always will be.

The soldier-statesman General Smuts, speaking to the Royal Geographical Society on the future of tropical East Africa, said: "In common with the rest of tropical Africa its full development is still retarded by the undefeated animal and human diseases, especially malaria. But the time is not far distant when science will have overcome these drawbacks, and when Central and East Africa will have become one of the most productive and valuable parts of the tropics. In the meantime, and until science solves the problems of tropical disease, East and Central Africa must not be looked upon as an area for white colonisation. Perhaps they will never be a white man's country in any real sense. In those huge territories the white man's task will probably be largely confined to that of administrator, teacher, expert, manager, or overseer of the large negro population, whose progressive civilisation will be more suitably

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promoted in connection with the industrial development of the land."

Our brief Empire survey would not be complete without the "Links of Empire." An empire scattered over the globe must depend very largely on the maintenance of means of communications for its continued existence. These means of com-



FIG. 95.—IN THIS PHOTOGRAPH WE SEE THE HOUSES OF PARLIAMENT IN LONDON

Here the "mother" Parliament of the Empire meets. The clock tower contains the famous Big Ben. On the left we see the fine tower of the House of Lords and in the background the towers of Westminster Abbey.

munication are largely great sea highways, and these demand ports of call, naval stations, refitting and repairing stations, coaling and victualling stations, wireless stations, and overland telegraph and submarine cables. Some of these are indicated on Fig. 92.

In the North Atlantic there are the Bermudas off the coast of the United States, and Jamaica in an

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excellent position for the Panama Canal routes. In the South Atlantic there are Ascension and St. Helena on the "Cape Route," and the Falklands conveniently situated for vessels making the passage round Cape Horn. In the Suez Route to India and the Far East there are Gibraltar, Malta, Cyprus, Aden, Colombo, Singapore, and

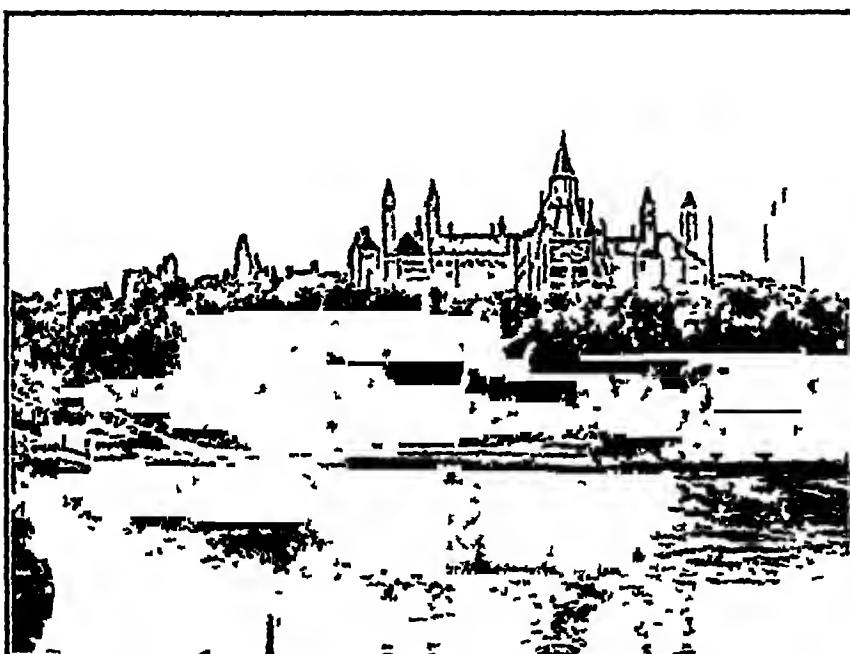


Photo by Canadian Pacific Railway

FIG 96—HERE WE HAVE THE NEW PARLIAMENT BUILDINGS IN OTTAWA WHERE THE "DAUGHTER" PARLIAMENT OF CANADA TRANSACTS ITS BUSINESS

They occupy a splendid position on high ground overlooking the Ottawa River

Hong-Kong. The Fiji and Samoan Islands can be called at by ships crossing the Pacific from Cape Horn, the Panama Canal, and Vancouver, and making for New Zealand, Australia, Singapore, or Hong-Kong

Canada and Australia are crossed from east to west by railways; and the north and south "Cape

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to Cairo " Railway, though not yet constructed through Central Africa, brings Rhodesia in rail communication with Cape Town. India has a very good system of main trunk railways, and in most parts of the Empire railways run from ports on the coast to inland areas. The land communications of the Empire need extension and development.

Perhaps before many years we shall have regular commercial air-ways between Britain on the one hand, and Africa, the Near East, India, and Australia on the other. Such journeys have been accomplished and may in time become part of the regular means of Empire communication.

Finally, whilst it is quite true to say that the very existence of an Empire scattered over the world is dependent upon its means of communication, it is something stronger than these that keeps the Empire together and even strengthens it. This is the good-will of the people of the Empire themselves. The government of Canada, Newfoundland, South Africa, Australia, and New Zealand has wisely been delegated to the colonists themselves. These countries are now grown-up co-partners with Britain in the affairs of Empire. Indeed, the British Empire is not an Empire at all, if by the word Empire we mean control from an all-powerful, dominating centre. It is a Commonwealth of British peoples voluntarily remaining in union with each other for the good of all its members, and, let us hope, for the good of the world as a whole.

To be a citizen of such an Empire is something to be proud of. Mistakes have been made, but no impartial person can deny that, on the whole,

Britain has presided over her Empire wisely, and, in particular, has paid marked attention to the interests of native peoples, so that her rule has been beneficial to the natives in their gradual civilisation. We Britishers have a great heritage, and we ought to be worthy successors of those who spent their lives in its upbuilding. But we must never forget that to have the privilege of belonging to the greatest Empire of all times brings responsibility to every one of us.

EXERCISES

1. "The Empire on which the sun never sets" How do you explain this picturesque title for the British Empire?
2. Look in your atlas at a map of the world which marks the various parts of the British Empire in distinctive fashion. What are the outstanding differences between the British and all the great empires of the past?
3. Which places do you think could be called "the lone outposts of Empire"? Can you find any other so lone as South Georgia? What do you know about that island?
4. Of what value to the Empire, apart from their products, is each of the following Singapore, Malta, Aden, the Cocos Islands, the Fijis, the Falkland Islands, Perim, Gibraltar, Jamaica?
5. Find out all you can about (i) the "All Red Route" and (ii) the proposed Empire Wireless Chain.
6. The two principal coalfields of the Southern Hemisphere are in British territory. Where are they? They are both mentioned in Chapter XIV.
7. Find out how each of the following parts of the Empire is governed Canada, British Guiana, India, Aden, Rhodesia.

CHAPTER XV

THE WORLD—A LIVING UNIT

WE have now read of all the principal types of the world's natural regions. We have seen that they differ very greatly from each other, and that because of these differences the way in which their inhabitants live, move, and have their being also differs. In some regions nature is bountiful, and man can live with little or no effort on his part. In others he maintains himself with great difficulty and wages an unending struggle against Nature. In others Nature rewards his efforts, sometimes sparingly and sometimes generously, provided he does his share and ploughs, sows, and reaps, whilst in others he is compelled to migrate from place to place, in order that he and his animals may live. You ought to be able to supply examples which fit each of these cases.

From what we have learned it follows that the peoples of the world are unequally distributed over the surface of the earth. Fig. 97 shows us their distribution. It shows very clearly that the four regions of greatest population are : (i) the monsoon lands of S E. Asia, where three-quarters of the people of the world live, (ii) and (iii) the industrial regions of eastern North America and Europe, and (iv) the European Mediterranean lands, which, like



FIG. 97.—THE DISTRIBUTION OF THE PEOPLES OF THE WORLD.

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the Asiatic monsoon lands, are lands with a very long human history. The distribution over the rest of the world you will be able to study and account for without difficulty, if you have mastered the previous chapters. You will see that the hot deserts, the tundra, and the Equatorial forests, with the exception of Java in the East Indies (see page 142), support very few people, and, of course, the Antarctic continent supports none at all.

Now this chapter has been entitled, "The World —a Living Unit" How can an area so vast, with so many different natural regions, each with its own special type of environment, be regarded in its entirety as a single unit? This cannot be answered in one sentence. In the days of the Roman Empire when that Empire held sway over the known world, at that time largely the lands surrounding the Mediterranean Sea, the world could be described as a Living Unit, for all parts were ruled by the same power. Roman law and order prevailed, and roads and ships bound the whole together. With the fall of Rome world unity disappeared, and until our own time the opportunity of attaining it, though not by means of a single world power, has not presented itself.

The great discoveries of the fifteenth and sixteenth centuries enlarged men's ideas of the world and led to a great extension of geographical knowledge. When, in the eighteenth and nineteenth centuries, large manufacturing industries based on coal and iron began to appear, and with them numerous industrial towns where the people worked in great factories, European countries began to look around for lands which could supply

raw materials for their industries, and whose people formed markets for the finished articles. At the same time men and women from their crowded areas emigrated to occupy some of the empty spaces of Canada, the United States, Argentina, South Africa, Australia, and New Zealand, where they produced food, wool, and many other articles urgently required in the industrial regions. And, of course, such emigrants also became buyers of the manufactured articles.

To-day, the whole world is known. The last great conquests were of the Poles. No great river, no great mountain range, no extensive area of fertile country can reward the explorer of the future. There is no unclaimed land, for every part of the world has been pegged out and claimed by some country or other. Only fifty years ago this was not the case. To-day, for the first time in history, the book of the discovery of important new lands is closed.

Increased knowledge of the earth's surface and the extension of commercial intercourse accompanied each other, except in the case of the discovery of uninhabitable land. Before the days of trade and commerce there must have been robbery with or without violence. A primitive savage who saw someone with an article he desired would probably, if he were strong enough, hit its possessor on the head and take it. One writer has said that this short and simple method sometimes happens even in modern times among highly civilised peoples. It is quite clear, however, that the limitation of this method became obvious, and right at the very dawn of history we find records of com-

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mmercial transactions. The primitive savage does everything for himself. As progress takes place some show greater skill at a certain task, and specialisation within a small group takes place. This group extends, and in time people living at a considerable distance hear of the product, and the field of trade is further widened. This soon becomes inter-tribal, and finally international. At this stage different regions influence each other and vitally affect each other's progress and prosperity. Such worldwide commercial relations are important factors in the establishment of world unity. They are extremely beneficial to man, although here and there we find mistakes have been made, and in some cases trading rivalries have led to jealousies and war.

Side by side with the great modern increase in commercial intercourse, there has been a most remarkable development of means of communication. The world is now encircled by steamship tracks and by railways, and bound round with telegraph wires and cables. Aircraft have crossed the Atlantic; one aeroplane has made the flight from London to Australia, and many commercial air lines have been established. The air is full of messages being flashed from wireless stations and from ships at sea. People in South Africa have heard Pittsburg concerts picked up by a London wireless station and then re-transmitted. Thus the barriers between peoples are being broken down, and men and women everywhere are slowly but surely realising that the modern world is a Living Unit.

This realisation was accelerated during the years



FIG 98—THIS PICTURE SHOWS VARIOUS METHODS OF TRANSPORT.

- 1 Camel caravan crossing the desert
- 2 Instone Air Liner loading goods in France for transport to England
- 3 The Japanese rickshaw a familiar scene in the East
- 4 Fast goods train leaving King's Cross for the North
- 5 Travelling over the snow towards the Pole
- 6 Carter, Paterson & Co's lorry a link between the Dock and Distributing Centre.
- 7 The familiar "C.P." horse and van a link between the Distribution Centre and the user
- 8 R.M.S. Berengaria Cunard liner bound for New York.

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of the Great War, into which most of the peoples of the world were inevitably drawn, either directly or indirectly. Never again can an important event of any kind occur in any part of the world without the whole knowing and being affected by it, for whether we have all realised the fact or not, the world is now one great home of man, a Living Unit.

The worldwide development of commercial relationships, the spread of European peoples to overseas lands in which they could make permanent homes, the closing of the book of important geographical discoveries, and the remarkable progress in the methods of transport and communication by land, water, and air, have been the principal factors whereby the reality of the modern world as a single, living unit has been brought home to the minds of thoughtful men and women. And just as in any complex living organism, so in the case of the world unit, sickness in any part affects the health of the whole, e.g., a shortage in the American cotton crop, the failure of the Indian monsoon, or the unsettled political affairs of Russia or Germany, may cause serious unemployment in Lancashire.

If this is true, and undoubtedly it is, we are now not only citizens of our local village, township, or city, of our county, country, or worldwide Empire, but we are citizens of the world whose duty it is to try to understand the lives, hopes, and aspirations of peoples of all regions. We must not study other countries and their peoples merely to find out what we can get out of them, but as a growth to be cherished and helped to reach the best and happiest state it can. We must be true and loyal

sons and daughters of country and Empire, but we must extend our interests and sympathies to all.

Two world problems to which some reference has already been made are of special importance. It is necessary that the peoples of the West, i.e. Europe and America, and of the Far East, i.e. India, China, and Japan, should get to understand each other better (page 167). The great concentration of most of the world's peoples in these lands and their increasing 'industrial character makes this necessity all the more urgent. There is also the problem of the ownership and development of tropical lands—which modern industrial countries are anxious to possess on account of their wealth of raw materials. General Smuts, in the lecture from which we made a quotation in the last chapter, said : "Formerly we did not fully appreciate the value of the tropics in the economy of civilisation. It is only quite recently that people have come to realise that, without the abundance of the raw materials which the tropics alone can supply, the highly developed industries of to-day would be impossible. Vegetable and mineral oils, cotton, sisal, rubber, jute, and similar products in vast quantities are essential requirements of the industrial world ; and the more that is recognised, the greater the rôle which the tropics will play in the future of the world."

We have learned how the settlement of Europeans in tropical lands is dependent upon the conquest of malaria, sleeping-sickness, and other diseases (page 255). We also saw that General Smuts hinted that such lands may never become white men's homes in any real sense. How important it is,

then, that we should understand the problems presented by the presence of large numbers of native peoples ? In West Africa the negro no longer goes about almost naked, but dresses in cotton goods made in Lancashire. His house is often made of sun-baked bricks roofed with corrugated iron. He is learning to read and write, and in many ways is becoming " civilised."

Where once the forest grew, plantations of cocoa and rubber and ground-nuts, owned and cultivated by natives, are springing up. British and French mining companies have mines to obtain gold and tin from the rocks. Good harbours are being made, railways built, and motor roads constructed. All is changing, and soon the black man, instead of being slave to the white, will be his fellow-worker. Under the guidance and with the help of Europeans the negroes are learning how they may become rich by their own work. Most negroes still live as their ancestors have lived for centuries, but some, at least, are learning how to make the tropics prosperous as Europeans have made prosperous, not only their own homes in Europe, but many new homes in North and South America, South Africa, and Australasia.

Some native tribes inhabiting tropical lands are extremely backward, and it will be a long and patient task to improve their position, but that is no reason why it should not be attempted, and it is no excuse for the fact that in the year 1924 backward natives in some parts of South America and Africa are still regarded and treated as slaves. Moreover, improvements in medical treatment, sanitation, drainage, and house-building are as

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much needed for the natives as for Europeans dwelling in tropical lands, for fever, malaria, sleeping-sickness, and other diseases work havoc among them

We have now not only surveyed the regions of the world ; we have also learned that the great world itself should be regarded as a unit. It should not be considered as a mass of independent and loosely related countries and states, but as a Living Unit, in which, as the years go by, the various regions and their peoples must become more and more bound to each other in bonds of understanding, sympathy, and dependence upon each other.

Finally, we can sum it all up in the words with which we ended Book II in this series. "The world to-day is closely knit together by many ties, and we, like other people, find our 'home' and our 'country' closely connected with other 'homes' and 'countries.' Thus must we learn to think, not of ourselves alone, but of all those unknown to us in this and other countries who provide us with the things we need, and to remember that our work will be for others no less than for ourselves "

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